Astronomy & Astrophysics manuscript no. ngc
December 11, 2009

The first search for variable stars in the open cluster NGC 6253 and its surrounding field *,**

F. De Marchi[1,2], E. Poretti[3], M. Montalto[4,5], S. Desidera[6], and G. Piotto[1]

[1] Dipartimento di Astronomia, Università di Padova, Vicolo dell'Osservatorio 2, 35122 Padova, Italy
[2] Dipartimento di Fisica, Università di Trento, Via Sommarive 14, 38123 Povo (TN), Italy
[3] INAF – Osservatorio Astronomico di Brera, Via E. Bianchi 46, 23807 Merate (LC), Italy
[4] Universitaets-Sternwarte der Ludwig-Maximilians-Universitaet, Scheinerstr. 1, 81679 Muenchen, Germany
[5] Max-Planck-Institute for Extraterrestrial Physics, Giessenbachstr., Garching bei Muenchen, 85741, Germany
[6] INAF – Osservatorio Astronomico di Padova, Vicolo dell'Osservatorio 5, 35122 Padova, Italy

Received, accepted

ABSTRACT

Aims. This work presents the first high–precision variability survey in the field of the intermediate-age, metal–rich open cluster NGC 6253. Clusters of this type are benchmarks for stellar evolution models.

Methods. Continuous photometric monitoring of the cluster and its surrounding field was performed over a time span of ten nights using the Wide Field Imager mounted at the ESO-MPI 2.2m telescope. High–quality timeseries, each composed of about 800 data-points, were obtained for 250,000 stars using ISIS and DAOPHOT packages. Candidate members were selected by using the colour–magnitude diagrams and period–luminosity–colour relations. Membership probabilities based on the proper motions were also used. The membership of all the variables discovered within a radius of 8′ from the centre is discussed by comparing the incidence of the classes in the cluster direction and in the surrounding field.

Results. We discovered 595 variables and we also characterized most of them providing their variability classes, periods, and amplitudes. The sample is complete for short periods: we classified 20 pulsating variables, 225 contact systems, 99 eclipsing systems (22 β Lyr type, 59 β Per type, 18 RS CVn type), and 77 rotational variables. The time–baseline hampered the precise characterization of 173 variables with periods longer than 4–5 days. Moreover, we found a cataclysmic system undergoing an outburst of about 2.5 mag. We propose a list of 35 variable stars as probable members of NGC 6253.

Key words. Stars: starspots – Stars: statistics – Stars: variables: general – binaries: eclipsing – novae, cataclysmic variables – open clusters and associations: individual: NGC 6253

1. Introduction

NGC 6253 and NGC 6791 are the only open clusters whose metallicities above [Fe/H]=+0.3 were confirmed by spectroscopic analyses (Carretta et al. 2000, 2007; Sestito et al. 2007). Therefore, these clusters are of special interest in several fields, e.g., as benchmarks for stellar evolution and stellar population models and as targets for the search for extrasolar planets. We observed both clusters in the framework of our project looking for transiting planets in super–metal–rich open clusters. The results obtained on NGC 6791 were presented by Montalto et al. (2007).

We also performed a 10-night observing campaign on NGC 6253 with the same purposes as for NGC 6791. In the first paper based on our new investigation, Montalto et al. (2009) obtained broad band photometry and astrometry for 187,963 stars within 30 arcmin from the cluster. Images from ESO archive (Momany et al. 2001) were also used to derive relative proper motions and then distinguish between field stars and cluster members. The availability of the astrometric cluster memberships and the photometric quality of the new data allowed new, independent determinations of the cluster's main parameters. Indeed, the determinations of the NGC 6253 parameters are affected by larger uncertainties because of the cluster's projection toward a very rich stellar field fairly close to the galactic centre (l=335.46 deg, b=–6.25 deg). Systematic differences in the photometric calibrations of different datasets have been found (Bragaglia et al. 1997; Piatti et al. 1998; Sagar et al. 2001; Twarog et al. 2003; Anthony-Twarog et al. 2007). In this paper we adopt the values of the distance modulus and of the reddenings obtained by Montalto et al. (2009) using the technique of the isochrone fitting, i.e., $(m-M)_V$=11.68±0.10 mag, $E(B-V)$=0.15±0.02 mag and $E(V-I)$=0.25±0.02 mag. These values are also consistent with a weighted mean of all the determinations. The cluster age is about 3.5 Gyr (Montalto et al. 2009).

Our project gives the possibility of studying stellar variability in super–metal–rich stars using high–quality data (De Marchi et al. 2007). Since no variability survey on NGC 6253 has previously been performed, we characterize the variable stars in NGC 6253 and in its surrounding field for the first time. To do that, we started from the new findings and calibrations obtained by Montalto et al. (2009) so we refer the reader to that paper for a more detailed explanation of the methodologies applied to

Send offprint requests to: F. De Marchi
e-mail: fdemarchi@science.unitn.it

* Based on observation made at the European Southern Observatory, La Silla, Chile, Proposal 073.C-0227.

** Timeseries and light curves are available in electronic form at the CDS via anonymous ftp to cdsarc.u-strasbg.fr (130.79.128.5). or via http://cdsweb.u-strasbg.fr/cgi-bin/qcat?J/A+A/.

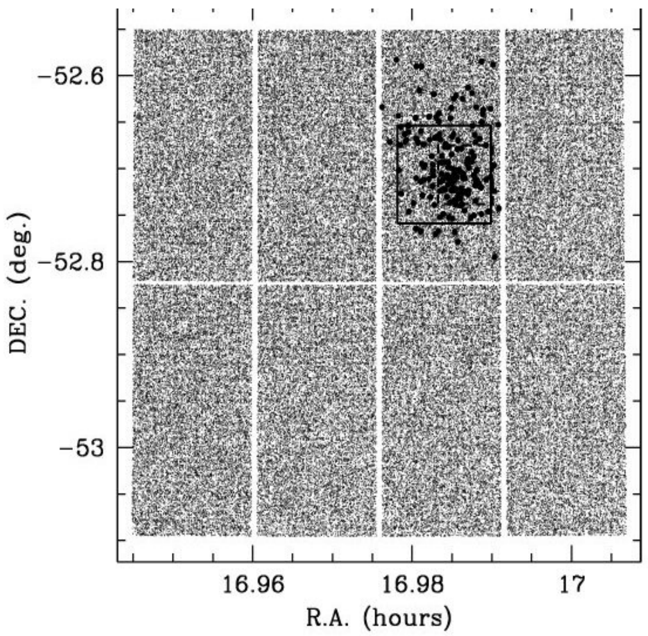


Fig. 1. Image of the WFI field (32 × 32 arcmin^2). Solid lines represent the edges of the 6.3x6.3 arcmin^2 box surveyed by Bragaglia et al. (1997). Large points are stars with membership probabilities (available only for stars located in chip 2) greater than 90%. Chips are numbered from 1 (top right) to 8 (bottom right).

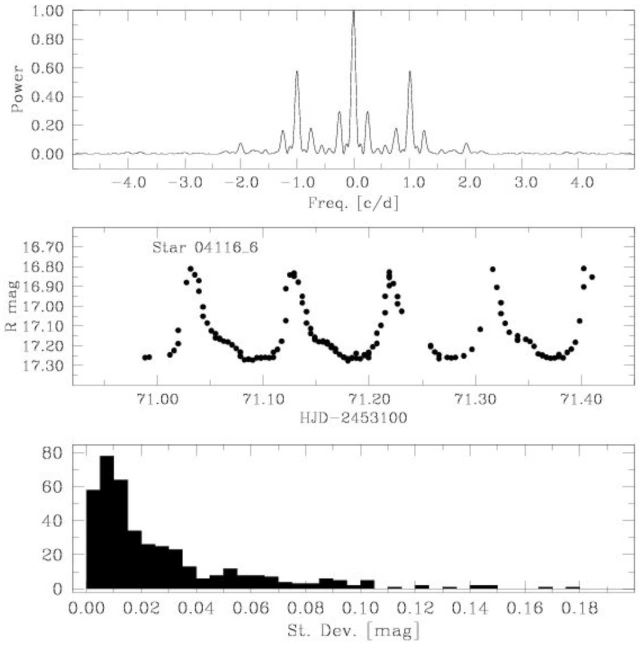


Fig. 2. *Upper panel:* spectral window of the timeseries of the variable stars in NGC 6253. *Middle panel:* Example of an unfolded light curve: the high–amplitude δ Sct star 044116_6. *Bottom panel:* Histograms of the standard deviations of the least–squares fit on the light curves of the periodic variables.

determine the properties and the fundamental parameters of the cluster.

Table 1. The observation log for each night and limits of the field of view.

Date [Year 2004]	t_{start} [HJD-2453100]	t_{end}	Date [Year 2004]	t_{start} [HJD-2453100]	t_{end}
June, 13-14	70.57	70.91	June, 18-19	75.48	75.90
June, 14-15	71.49	71.91	June, 19-20	76.46	76.67
June, 15-16	72.46	72.90	June, 20-21	77.84	77.87
June, 16-17	73.69	73.87	June, 21-22	78.44	78.76
June, 17-18	74.49	74.89	June, 22-23	79.46	79.90
α_{min}	$16^h\ 56^m$ 41.6		α_{max}	$17^h\ 00^m$ 24.7	
δ_{min}	-53° 05′43.8″		δ_{max}	-52° 33′00.8″	

2. Observations and data reduction

NGC 6253 was observed for 10 consecutive nights (from June 13, 2004 to June 22, 2004) using the wide–field imager (WFI) mounted at the ESO-MPI 2.2m telescope, La Silla, Chile. The WFI instrument includes a mosaic of eight 2k×4k CCDs. The pixel scale is 0.238 arcsec/pixel. In total, ~45.3 hours of observation were collected, mainly in the R filter. A few deep images in the B, V, and I filters were also acquired to construct colour–magnitude diagrams (CMDs), along with a standard field to allow the calibration of the data. In total 918 images of the cluster were obtained, with a mean exposure time of 178 seconds. Table 1 reports the journal of observations and Fig. 1 shows a WFI image of NGC 6253. Since the the size of each chip is 8′ in right ascension and 16′ in declination, we centered the cluster on one chip to minimize the loss of stars between chips. Observations and data reduction to derive the calibrated photometry and the CMDs of the cluster are described in more detail in Montalto et al. (2009). The procedure to derive the light curves uses both ISIS 2.2 (Alard & Lupton 1998; Alard 2000) and DAOPHOT II (Stetson 1998) packages, as described in Montalto et al. (2007).

The length of the observing nights (more than 0.32 d in 7 cases and more than 0.40 d in 5 cases, see Table 1) reduced the height of the aliases situated at ±1 d^{-1} from the central peak down to below 60% of the power (Fig. 2, upper panel). Moreover, the light curves are very dense and their shape clearly defined on each night (Fig. 2, middle panel). Both these facts made the period detection quite straightforward, not only in the case of high–amplitude variables, but most of time also for small–amplitude, short–period variable stars.

As can be noted in Fig. 1, our survey covers a much larger field of view than the previous ones (6.3x6.3 arcmin^2 by Bragaglia et al. 1997, 3.8x3.8 arcmin^2 by Piatti et al. 1998). We could also identify new variable stars in a wide part of the surrounding field. The ISIS 2.2. and DAOPHOT II packages returned a photometric precision well below 0.01 mag in the magnitude range 14 ≤ R ≤ 19. A plot of the standard errors of the mean magnitudes in different filters is shown in Fig. 1 in Montalto et al. (2009). Stars brighter than the turn-off magnitude (V=14.5) are saturated in our photometry and cannot be studied. In particular, this constraint hampers the study of the variability of the blue stragglers, as performed by De Marchi (2008) in the more favourable case of NGC 6791.

3. Cluster membership

NGC 6253 is a relatively small cluster, but Bragaglia et al. (1997) noticed the necessity of moving 8′ from the cluster centre to find a legitimate external field. We followed this prescription

and we adopted the centre coordinates given by Bragaglia et al. (1997).

The measured stars are indicated by small points, the ∼150 stars with membership probability (hereafter MP) greater than 90% are highlighted with larger black points. MPs were calculated in Montalto et al. (2009) following the approach proposed by Vasilevskis et al. (1958):

$$MP = \Phi_c/(\Phi_c + \Phi_f) \quad (1)$$

where Φ_c and Φ_f are the distribution of cluster and field stars in the diagram of the proper motions, respectively. These distributions are typically represented as Gaussian functions. The distribution of the cluster stars has a narrow peak centered at $\mu_\alpha = \mu_\delta = 0$, while the distribution of field stars is much broader. For the given candidate member, the calculation of the MP was performed by selecting a surrounding sample of a 2.5 mag range centered on the candidate's position. In such a way the local sample stars compensate for the effect of a magnitude dependence of the cluster–to–field star ratio. When constructing a $V - MP$ diagram, the stars belonging to the cluster occupy a well–defined region (see Fig. 4 in Montalto et al. 2009). We require the probable member clusters to have MP> 90% at $V = 12.5$ and MP> 50% at $V = 18.0$.

Since the determination of the MPs is a differential process and the cluster is almost completely included in chip 2, the MPs are reliable only for stars belonging to this chip and brighter than V=18. Looking at the distribution of the stars with a high MP we can infer that some members of the cluster might also be present in chips 1 and 3.

4. The variable stars

4.1. Detection

The ISIS 2.2 and DAOPHOT II packages allowed us to extract the first list of suspected variable stars from the full database of 250,000 timeseries. This list was validated and shortened by calculating the parameters related to the reduction of the initial variance obtained by introducing trial periodic terms. These parameters are the reduction factor (Vaníček 1971) and the coefficient of spectral correlation (Ferraz-Mello 1981). As in the case of NGC 6971 (De Marchi et al. 2007), we could separate short- and long- period variable stars by introducing a parameter that is more sensitive to the night–to–night variations. Tests on the significance of the detected periodicities (e.g., signal–to–noise ratio above 4.0 in amplitude) allowed us to get a more defined sample of real variable stars. A few objects whose variability appears to stem from photometric artefacts (e.g. eclipse-like features occurring exactly at the same time on the second night) were removed from the list. These spurious photometric effects are usually corrected when applying to the light-curve algorithms such as the one developed by Tamuz et al. (2005). However, we noticed that the application of this algorithm degrades the precision of the variable star photometry. Therefore, being interested in much greater light variations than the tiny photometric effect of a planetary transit, we decided to analyse the light curves before applying the algorithm.

We identified 595 variable stars at the end of our process, whose timeseries are composed of about 800 datapoints. To identify them we used the five–digit number assigned by our customized package package, followed by the number of the chip that the star belongs to. The timeseries are available at the "Centre de Données astronomiques de Strasbourg" (CDS).

Table 2. Inventory of the variables found in NGC 6253 and its surrounding area.

Type	Number of variables all chips	r <8′	Candidate members	Probable members
RR Lyrae	4	1	0	0
δ Scuti	11	0	0	0
β Cep	1	0	0	0
HADS	4	0	0	0
EW-type	225	50	16	8
EB-type	22	6	2	0
EA-type	59	13	5	1
RS CVn	18	4	2	1
U Geminorum	1	1	1	1
Rotationals	77	27	16	15
Long period	173	41	16	9

4.2. Classification

The timeseries of the 595 variable stars were analysed in frequency by using the least–squares iterative sine–wave search (Vaníček 1971) and the Phase Dispersion Minimization (Stellingwerf 1978) methods. The periods were refined by means of a least–squares procedure (MTRAP, Carpino et al. 1987); their error bars are in the range $1-6 \times 10^{-5}$ d. The bottom panel of Fig. 2 shows the distribution of the standard deviations of the least–squares fits, indicating a median precision of 0.015 mag.

We could show amplitudes of light variability down to the 0.01 mag level. At this level, rotational variables could be separated from pulsating variables on the basis of the period values and of the Fourier parameters alone (Poretti 2001). On the other hand, it is very difficult to disentangle rotational from eclipsing variables. To distinguish rotational variables from contact binaries, we referred to the degree of asymmetry of the double–wave light curves and to the occurrence of the minima at phases 0.00 and 0.50. Of course, we cannot rule out that a small fraction of the variables classified as rotational variables might be actually contact systems showing grazing eclipses or viceversa.

We considered two classes of rotational variables, RO1 and RO2 stars. RO1 stars show a light curve characterized by a single wave, which is often asymmetrical. RO2 stars show a more complicated curve composed of two waves having unequal amplitude and duration. This light curve is comes from two (groups of) spots located at different latitudes that remain visible to the observer during different fractions of the rotational period. In some cases these spotted stars are observed in eclipsing systems, the so-called RS CVn variables. Other cases of eclipsing systems are contact (W UMa variables, EW), semi-detached (β Lyr variables, EB), and detached systems (Algol variables, EA) binaries. In some cases it was very difficult to distinguish between EW system showing grazing eclipses and rotational variables. We also identified three different classes of pulsating variables, i.e., RR Lyr, δ Sct and High–Amplitude δ Sct (HADS) stars. In both cases, eclipsing binaries and pulsating variables, the very good spectral window (Fig. 2) made the period detection quite straightforward. On the other hand, defining the periods longer than 4–5 d was not easy. In particular it was impossible for periods longer than 10 d and we simply classify these stars as long period (LON) variables. These stars are mostly rotational variables. The summary classification of the entire sample is reported in Table 2. Tables A.1, A.2, A.3, A.4, A.5, A.6, A.7, and A.8 list the members of each class giving the identifier in the Montalto et al. (2007) catalogue, the coordinates, the pho-

tometry, the epoch of maximum or minimum brightness (HJD–2453100), the period, the amplitude, the distance, and the MP values. Uncertain MP values (stars with V >18, often close to the chip borders) are marked with an asterisk. The catalogue of the light curves of the periodic variables is available at the CDS.

We paid particular attention to the variables located within 8′ from the cluster centre; in any cases no variable with MP larger than 50% was found at a greater distance. If the MP is not available (stars near the edges of chip 2 or stars fainter than V=18), the membership is estimated from their location on the $B-V$ vs. V and $V-I$ vs. V CMDs. Moreover, for pulsating variables and contact binaries with unknown membership, our conclusions are based on the applications of the usual period–luminosity ($P-L$) and period–luminosity–colour ($P-L-C$) relations.

4.3. Pulsating variables

The only pulsating variable located at less than 8′ from the centre is the RRab star 10540_2. Its MP is quite high, but it is clearly too faint (V=17.39) to belong to the cluster. Amongst the other four RR Lyr stars, 15578_7 is a new galactic Blazhko variable.

Twelve variables show an amplitude smaller than 0.06 mag; since they have a very short period (less than 0.10 d), we can rule out their being rotational variables. All the $B-V$ values except one range from 0.42 to 0.79 mag, mostly between 0.50 and 0.63. This interval, taking the reddening $E(B-V)$=0.15 mag into account, suggests their classification as δ Sct stars. The remaining low-amplitude variable shows $(B-V)$ = 0.084: it probably belongs to the β Cep class.

Four variables show a larger amplitude (more than 0.09 mag) and the asymmetric shape of the light curve typical for high–amplitude δ Sct stars. By using the new period–luminosity relation derived by Poretti et al. (2008), no doubt is left on the fact that all these variables do not belong to NCG 6253. Finally, none of the pulsating variables is a member of NGC 6253, since they are all located well beyond the cluster.

4.4. Contact binaries

We have 50 contact binaries located within the 8′ radius and the $(B-V)$ and $(V-I)$ colours are both available for 44 binaries, while only the $(V-I)$ colours are available for 6 of them. For these stars it is possible to apply the $P-L-C$ relations given by Rucinski (2003) and compare the resulting distance moduli with that of the cluster, obtained by isochrone fitting (Montalto et al. 2009). The errors on the distance moduli are calculated by considering the uncertainties on the mean $B-V$ and $V-I$ colours. It must also be taken into account that, since our light curves are in the R band, we cannot know the exact value V_{max} of the magnitude at maximum brightness required by the Rucinski (2003) calibrations. We estimated V_{max} as $(V_{mean}-R_{mean})+R_{max}$; i.e., we assumed that the colour of these binary systems does not change during the orbital period since the components have a very similar temperature.

An estimate of the membership of the objects can be obtained using the CMDs (Fig. 3, top row), the MPs based on the proper motions, and the two $P-L-C$ relations (Fig. 3, bottom row). The fiducial lines shown in the CMDs are obtained by selecting 10–15 points at different magnitudes along the Main Sequences, both from the observations described here and from Bragaglia et al. (1997). We could select a list of 13 candidate members for which one of the above criteria is satisfied (Table A.9).

We note that 23188_2 and 10853_2 satisfy all the membership criteria and then are very likely cluster members. The position in the CMDs and the $P-L-C$ relations also suggest that 01015_2 is a cluster member, but this hint is not supported by the MP, which is very small. The case of 09268_2 is the opposite: it has also a fairly large MP, but the other indicators suggest that is is more probably located between the Sun and the cluster. Unfortunately, none of the remaining cases gives us enough confidence on a cluster membership.

We can tackle the problem of cluster membership in an indirect way. In the surrounding field we found 175 EW binaries, with an incidence of 0.21 EW arcmin^{-2}. Therefore, we should have 42 field EW–stars superposed on the cluster. Since we found 50 stars (Table 2), the excess is only marginally significant. We have only two well–established memberships; therefore, we can reasonably estimate that very few contact binaries (up to six) among the remaining 11 candidates listed in Table A.9 actually belong to NGC 6253. This clue is confirmed by the candidates do not match the photometric criteria very well (Table A.9). In NGC 6791 we found three well-established and five likely EW–members (De Marchi et al. 2007), i.e., similar countings. The surveys of the two clusters are complete both at the magnitude and at the periods of the EW binaries. The two clusters have a different stellar content, since NGC 6253 has about 500-1000 members (Montalto et al. 2009), and NGC 6791 about 4900±1000 (De Marchi 2008). The similarity between EW countings in the two clusters supports the hypothesis of an anticorrelation between the frequency of binaries and the richness of the host cluster (Kaluzny & Rucinski 1995).

Among the non-member contact binaries, we note that 00441_4 has a period of 0.21002 d, shorter than the shortest contact binary found in the ASAS database (P=0.217811 d, ASAS 083128+1953.1, Rucinski 2007) and very similar to the binary with the shortest period known (P=0.2009 d, V344 in the Lupus field, Weldrake & Bayliss 2008).

4.5. Semi-detached and detached systems

The sample of the semi-detached and detached systems within 8′ is composed of five EA, two EB, and two RS CVn stars (lower part of Table A.9). Their periods are shorter than 2.3 d. The star 26902_2 has a high MP, and it is the only case for which we can be very confident about its membership, also confirmed by the positions in the CMDs (Fig. 4, left panels). On the basis of the same criteria, 10340_2 is another probable member. On the other hand, the MP value rules out the membership of 00145_2. No firm conclusion on the membership can be drawn on the other cases.

4.6. Rotational and long-period variables

A great number of the new variables discovered in our survey shows the single (RO1) or double (RO2) wave light curves typical of rotational effect. The 10–d time baseline allowed us to detect all the variables with rotational periods shorter than 4–5 days. Other variables show an evident night–to–night variability, but we cannot infer any reliable value for the period. These variables are probably long-period ones (LON).

By adopting the same criteria as used in other cases, we selected the RO1 (14 stars), RO2 (2 stars), and LON (16 stars) candidate members of NGC 6253 (Table A.10). Figure 4 plots the

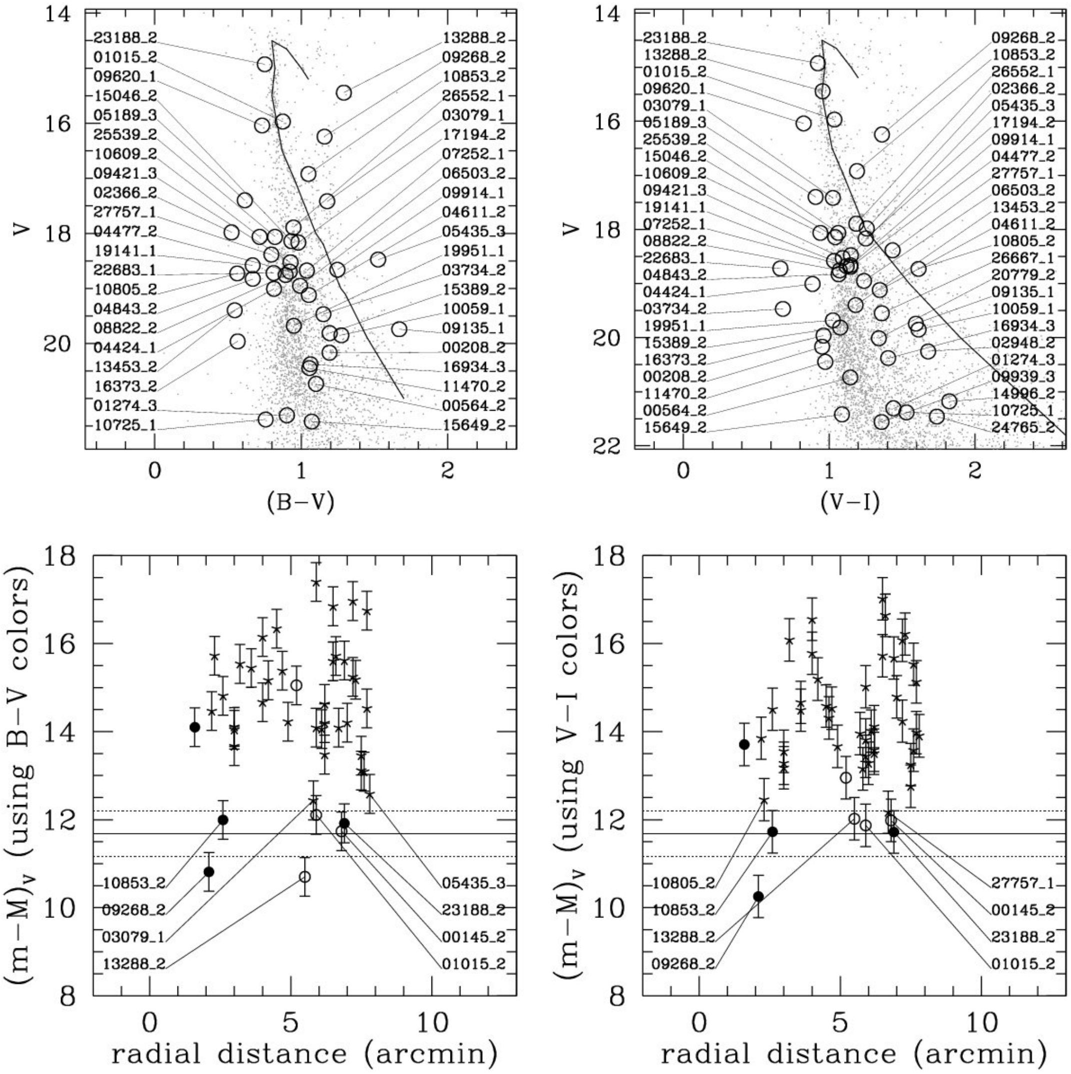


Fig. 3. *Top row:* colour–magnitude diagrams of NGC 6253 with the contact binaries at $r < 8'$ highlighted. The Main Sequences are individuated by fiducial lines. *Bottom row:* Distance moduli of all contact binaries at $r < 8'$ obtained using the *P-L-C* relations. We use both $(B - V)$ (left panel) and $(V - I)$ colours (right panel). The horizontal line represents the distance modulus of the cluster resulting from isochrone fitting (Montalto et al. 2009). Filled circles show the binaries with MPs>50%; open circles the stars with MPs<50%, starred points the binaries with unknown membership. The error bars are the errors associated with the M_V calculation and include errors in the colour determinations.

CMDs with the positions of all the rotational variables within 8′ from the centre and the positions of the long-period variables highlighted (middle and right panels, respectively).

We discovered 27 variables in the 8′ radius from the centre and 16 of them can be considered candidate members on the basis of the positions on the CMDs and of the MPs (upper part of Table A.10). The stars 10042_2, 11077_2, and 06387_2 have a large MP and also a position on the CMDs compatible with cluster membership. We count 57 rotational variables in the surrounding field, i.e., an occurrence of 0.06 star arcmin^{-2}. This would imply an estimate of 12 field rotational variables along the line of sight of NGC 6253. There is a significant difference between the expected and the observed number of rotational variables, and we can infer that several selected candidate members (up to 15) actually belong to the cluster. Considering the short periods of these stars and the old age of the cluster, it is likely that the rotational variables that are cluster members are close, tidally locked binaries.

In the same manner, we can estimate 32 LON field variables superposed to NGC 6253. In turn this means that up to 9 out of the 41 LON variables discovered in the 8′ radius can be considered members of the cluster. These 9 stars should be found among the 16 candidate members listed in Table A.10.

4.7. A new cataclysmic variable

The U Geminorum variable 15877_2 is located at 6.8′ from the cluster centre, but unfortunately its MP is not available (Table A.10). In the light curve, the scatter at the quiescence phase suggests some photospheric activity, but no periodicity is detected by analysing these measurements. Such a phase lastes the first 8 days of our survey. After that, its brightness in the *R*-band increases by about 2.5 mag (Fig. 5). The maximum is not observed because it occurred in daytime. The star 15877_2 appears to be similar to the U Geminorum variable 06289_9, classified as a member of NGC 6791 (De Marchi et al. 2007).

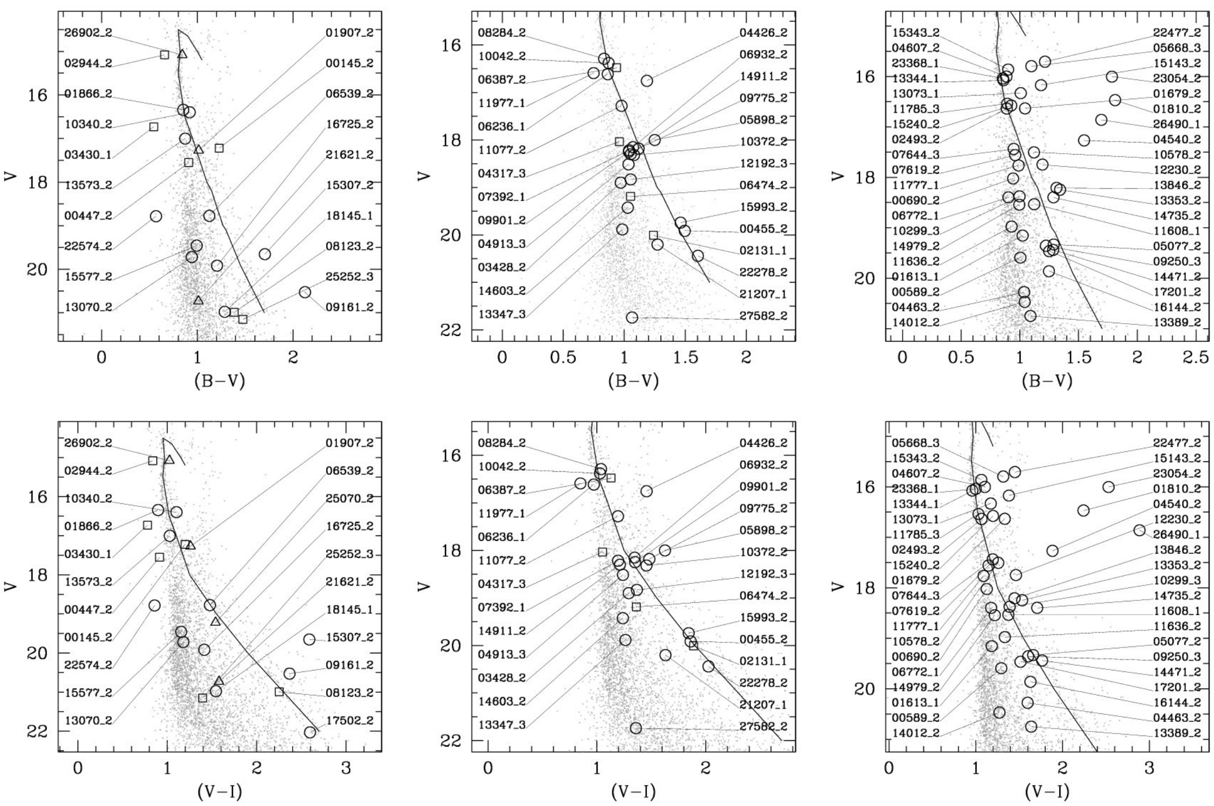


Fig. 4. *Left panels:* CMDs of NGC 6253 with the EA (circles), EB (squares), RS CVn (triangles) variables highlighted. *Middle panels:* CMDs of NGC 6253 with the rotational single-wave (circles), and double-wave (squares) variables highlighted. *Right panels:* CMDs of NGC 6253 with the long-period variables located within the 8′-radius circle highlighted. The Main Sequences are individuated by fiducial lines.

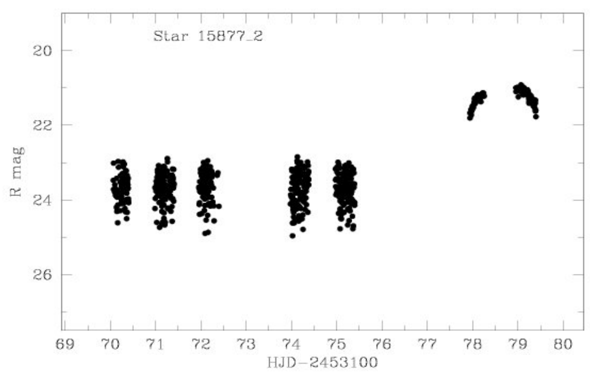


Fig. 5. Light curve of the new U Gem cataclysmic variable.

5. Conclusions

In this paper we have described the first search for variable stars in the open cluster NGC 6253. Since the membership probabilities based on the proper motions are not reliable for stars with $V > 18$, only a few variables could be confirmed directly as cluster members. However, the comparison with the number of contact binaries and rotational variables (both short and long periods) found in a large area surrounding the cluster allowed us to estimate the incidence of these variables within the cluster, too. On the basis of these considerations we propose 35 members of NGC 6253 within the sample of variable stars, though new observations are needed to identify some of them in an unambiguous way.

The class of main–sequence rotational variables is the most numerous, as observed in the surrounding field. On the basis of similar observing campaigns, we found the same number of contact binaries in NGC 6253 as were previously found in NGC 6791, thus confirming the anticorrelation between the frequency of binaries and the richness of the cluster (Kaluzny & Rucinski 1995). This anticorrelation is similar to the one found between the frequency of blue stragglers and the total magnitude of the host cluster. Both these facts can lead back to the important effects caused by mass loss in the evolution and in the history of the dynamics of open clusters (Davies et al. 2004; De Marchi et al. 2006).

We discovered a new eruptive variable in NGC 6253. A single outburst was observed, so we cannot infer any physical characteristic of the system. Since we made the same discovery in NGC 6971 (De Marchi et al. 2007), it seems that continuous surveys on a few nights are very effective in finding these rare and interesting objects.

Acknowledgements. This work was funded by COFIN 2004 "From stars to planets: accretion, disk evolution and planet formation" by MIUR and by PRIN 2006 "From disk to planetary systems: understanding the origin and demographics of solar and extrasolar planetary systems" by INAF. We thank the anonymous referee for careful reading and useful suggestions, and J. Vialle for checking the English form.

References

Alard, C., 2000, A&A, 144, 363
Alard, C., & Lupton, R.H. 1998, ApJ, 503, 325
Anthony-Twarog, B.J., Twarog, B.A., & Mayer, L., 2007, AJ, 133, 1585
Bragaglia, A., Tessicini, G., Tosi, M., Marconi, G., & Munari, U. 1997, MNRAS, 284, 477

Carpino M., Milani A.,Nobili A.M., 1987, A&A, 181, 182
Carretta, E., Bragaglia, A., Tosi, M., & Marconi, G. 2000, in "Stellar Clusters and Associations: Convection, Rotation, and Dynamos", eds. R. Pallavicini, G. Micela, & S. Sciortino, ASPC vol. 198, p. 273
Carretta, E., Bragaglia, A., & Gratton, R., 2007, A&A, 473, 129
Davies, M.B., Piotto, G., & De Angeli, F., 2004, MNRAS, 349, 129
De Marchi, F., 2008, PhD Thesis, University of Padova
De Marchi, F., De Angeli, F., Piotto, G., Carraro, G., & Davies, M.B., 2006, A&A, 459, 489
De Marchi, F., Poretti, E., Montalto, M., et al., 2007, A&A, 471, 51
Kaluzny, J., & Rucinski, S.M., 1995, A&A Suppl., 114, 1
Ferraz-Mello S., 1981, AJ, 86, 4
Momany, Y., Vandame, B., Zaggia, S., et al., 2001, A&A, 379, 436
Montalto, M., Piotto, G., Desidera, S. et al., 2007, A&A, 470, 1137
Montalto, M., Piotto, G., Desidera, S., et al., 2009, A&A, 505, 1129
Piatti, A.E., Clariá, J.J., Bica, E., Geisler, D., & Minniti, D., 1998, AJ, 116, 801
Poretti E., 2001, A&A, 371, 986
Poretti, E., Clementini, G., Held, E., et al., 2008, ApJ, 685, 947
Rucinski, S.M., 2003, New Astronomy Reviews, 48, 703
Rucinski, S.M., 2007, MNRAS, 382, 393
Sagar, R., Munari, U., & de Boer, K. S., 2001, MNRAS, 327, 23
Sestito, P., Randich, S., & Bragaglia, A., 2007, A&A 465, 185
Stellingwerf, R. F., 1978, ApJ, 224, 953
Stetson, P., 1998, PASP, 106, 250
Tamuz O., Mazeh, T., & Zucker S., 2005, MNRAS, 356, 1466
Twarog, B. R., Anthony-Twarog, B. J., & De Lee, N., 2003, AJ, 125, 1383
Vaníček, P. 1971, Ap&SS, 12, 10
Vasilevskis, S., Klemola, A., & Preston, G., 1958, AJ, 63, 387
Weldrake, D.T.F., & Bayliss, D.D.R., 2008, AJ, 135, 649

Appendix A: Tables

This appendix includes the Tables listing all the variables discovered in our survey of NGC 6253 and its surrounding field. The epochs of maximum or minimum brightness are expressed as HJD−2453100 in the columns $T_{\rm max}$ and $T_{\rm min}$.

1. Pulsating variables: Table A.1;
2. EW–type variables: Table A.2;
3. EA–type variables: Table A.3;
4. EB–type variables: Table A.4;
5. RS–CVn variables: Table A.5;
6. Rotational single–wave variables: Table A.6;
7. Rotational double–wave variables: Table A.7;
8. Long–period variables: Table A.8.

The binary systems considered as candidate members of NGC 6253 are listed in Table A.9. The rotational and long-period variables considered as candidate members of NGC 6253 are listed in Table A.10.

Table A.1. Pulsating variables.

Star	ID	Type	α_{2000} [deg]	δ_{2000} [deg]	$\overline{R}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm max}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
16334_6	132171	DSCT	254.517933029	-52.919478492	17.548	17.854	0.539	0.767	70.605	0.03065	0.02	15.6	-
11353_4	79692	DSCT	254.373216875	-52.592925272	18.915	19.257	0.557	0.703	70.586	0.03818	0.04	16.0	-
04756_6	123786	DSCT	254.547272025	-53.053321129	16.815	17.179	0.568	0.762	70.586	0.04065	0.04	22.2	-
22953_1	16369	DSCT	255.057077875	-52.629821132	15.968	16.179	0.517	0.566	70.613	0.04182	0.02	11.4	-
03523_3	48443	DSCT	254.462580529	-52.719165053	15.640	15.871	0.501	0.562	70.582	0.04970	0.01	11.2	-
16076_4	83210	DSCT	254.275776771	-52.633207459	15.884	16.226	0.795	0.870	70.586	0.05494	0.06	18.6	-
08420_6	-	DSCT	254.504434833	-52.893020827	14.413	14.657	0.422	0.583	70.629	0.05611	0.02	14.7	-
22047_5	112116	DSCT	254.376286383	-53.047895213	17.184	17.491	0.543	0.669	70.586	0.05823	0.03	24.9	-
04942_4	75001	DSCT	254.212624222	-52.776630550	17.095	17.468	0.709	0.820	70.617	0.06244	0.04	20.7	-
08514_6	126360	DSCT	254.438176757	-52.890241485	17.543	17.897	0.626	0.839	70.590	0.06752	0.01	16.3	-
08103_4	77295	DSCT	254.243943022	-52.694411286	15.377	15.705	0.556	0.717	70.625	0.09455	0.01	19.2	-
04796_8	168842	BCEP	254.944203244	-53.041599923	19.135	19.163	0.084	0.223	70.602	0.09594	0.05	21.0	-
09747_6	127155	HADS	254.604170726	-52.830336615	16.301	16.582	0.463	0.672	70.586	0.06248	0.09	9.5	-
15098_6	131167	HADS	254.510582760	-53.067284303	17.869	18.320	0.778	0.796	70.648	0.08412	0.09	23.5	-
26414_6	139434	HADS	254.516592439	-53.032263755	17.134	17.474	0.815	1.063	70.602	0.09374	0.43	21.5	-
04116_6	123296	HADS	254.509177522	-53.088555644	15.341	15.607	0.967	0.584	70.648	0.09771	0.24	24.7	-
04180_4	74452	RR	254.326743597	-52.796666245	15.052	15.283	0.541	0.542	70.594	0.31073	0.27	17.0	-
10540_2	31353	RR	254.804741412	-52.673375403	16.839	17.392	0.937	1.195	70.965	0.43030	0.20	2.4	72
15578_7	157161	RR	254.658078793	-52.867473297	15.698	16.416	1.104	1.057	71.051	0.51335	0.58	10.4	-
03814_4	74180	RR	254.299365192	-52.807157581	17.268	17.786	0.114	0.989	71.066	0.53648	0.68	18.1	-

Table A.2. Contact binaries, W Ursae Maioris (EW) systems.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$R_{\max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
00441_4	71609	254.249749852	-52.783032714	21.373	22.350	–	–	70.586	0.21002	0.38	19.5	-
12192_1	8870	255.062764181	-52.626856921	20.939	21.825	1.257	1.514	70.664	0.22407	0.33	11.7	-
10086_5	103181	254.190530241	-52.847147618	21.454	22.485	–	1.488	70.766	0.22423	0.53	22.6	-
05190_4	-	254.295195930	-52.770167681	21.301	–	–	–	70.715	0.23070	0.36	17.7	-
16081_3	58760	254.592712898	-52.627579802	18.395	19.641	1.284	1.981	70.727	0.23203	0.62	8.1	-
00114_5	96333	254.295625017	-53.085374595	19.655	20.725	1.248	2.135	70.785	0.23280	0.09	28.4	-
02456_8	167381	255.061442816	-52.915981403	20.509	21.376	1.135	1.700	70.773	0.23753	0.12	16.3	-
14996_2	34880	254.822841068	-52.614263010	20.154	21.178	–	1.824	70.609	0.23792	0.27	6.0	-
20865_3	63000	254.498330473	-52.646392743	19.715	20.850	1.521	2.258	70.711	0.23934	0.11	10.6	-
27129_8	-	254.993760438	-52.993939447	19.440	20.209	0.997	1.324	70.777	0.24018	0.15	18.9	-
22710_1	16193	255.022664864	-52.637298947	20.784	21.621	1.117	1.564	70.605	0.24073	0.62	10.1	-
21930_7	162711	254.784644788	-52.843480211	18.230	19.355	–	1.605	70.633	0.24190	0.44	8.1	-
14717_5	106596	254.212008777	-52.870254233	20.410	21.290	1.404	1.548	70.668	0.24230	0.16	22.5	-
23722_8	182411	254.970157647	-52.960266787	19.637	20.371	0.908	1.344	70.797	0.24369	0.16	16.8	-
24765_2	42656	254.666899001	-52.778818924	20.449	21.460	–	1.739	70.797	0.24825	0.15	5.7	-
26486_8	184282	254.983595143	-52.931826300	19.289	20.060	0.898	1.378	70.582	0.25020	0.18	15.5	-
21314_8	180687	254.984152102	-52.931749589	20.371	20.999	–	1.237	70.582	0.25022	0.10	15.5	-
12315_5	104816	254.387100203	-53.003676349	19.854	20.960	1.346	1.371	70.719	0.25155	0.53	22.5	-
24956_4	89926	254.354675748	-52.749692425	17.686	18.512	0.973	1.519	70.605	0.25528	0.16	15.3	-
11889_8	173634	254.922734335	-53.080302607	19.862	20.621	0.891	1.383	70.723	0.25613	0.35	23.0	-
15389_2	35188	254.668544733	-52.609301921	19.097	19.813	1.194	1.076	70.582	0.25870	0.32	7.0	-
07718_6	125822	254.448000418	-52.925176299	20.786	21.794	–	1.860	70.773	0.25921	0.46	17.5	-
18192_4	84868	254.208561211	-52.770496891	20.181	20.888	0.954	1.169	70.727	0.25922	0.16	20.8	-
15124_4	82525	254.183205245	-52.682386924	18.001	18.796	1.070	1.506	70.766	0.26079	0.06	21.4	-
20347_5	110829	254.333465255	-52.915307869	19.330	20.013	0.897	1.079	70.672	0.26120	0.16	20.1	-
09939_3	53489	254.578008313	-52.659187700	20.551	21.560	–	1.359	70.703	0.26154	0.53	7.6	-
23514_6	137335	254.533053333	-52.956842920	17.564	18.897	–	2.077	70.734	0.26185	0.71	17.2	-
03026_5	98378	254.392785436	-52.857632041	20.548	21.713	0.412	2.025	70.730	0.26267	0.45	16.4	-
09894_8	172188	255.049610106	-52.884158349	19.308	20.316	1.490	1.652	70.645	0.26627	0.22	14.6	-
26159_6	139249	254.508259512	-52.860672497	18.820	19.514	0.887	1.421	70.824	0.26690	0.42	13.2	-
16934_3	59513	254.572819226	-52.718571769	19.670	20.377	1.063	1.405	70.664	0.26867	0.04	7.2	-
09268_2	30341	254.720919972	-52.690243537	15.572	16.244	1.159	1.363	70.637	0.26920	0.04	2.1	87
06219_6	124811	254.555448586	-52.992533248	19.558	20.305	1.347	1.589	70.773	0.26973	0.28	18.8	-
10521_1	7659	254.986871345	-52.653167432	19.136	20.120	–	1.603	70.832	0.27082	0.21	8.5	-
28959_2	-	254.704243622	-52.677695755	19.768	–	–	–	70.688	0.27090	0.07	3.0	-
25539_2	-	254.704639242	-52.677632332	17.679	18.064	0.821	1.062	70.676	0.27100	0.01	3.0	-
27971_5	-	254.377002588	-52.882855086	18.382	19.177	1.233	1.178	70.801	0.27217	0.31	17.7	-
08990_4	77937	254.222567345	-52.670406112	20.647	21.638	1.230	2.200	70.777	0.27235	0.10	20.1	-
07630_4	76944	254.362861775	-52.707213027	20.151	20.805	0.827	1.451	70.727	0.27260	0.50	14.8	-
27757_1	19653	254.908178020	-52.633411290	17.629	18.386	0.796	1.435	70.848	0.27310	0.30	6.7	-
14165_4	81814	254.226110018	-52.731525643	22.360	–	–	–	70.781	0.27445	0.43	19.8	-
26461_4	90980	254.226958269	-52.731893244	18.934	19.682	1.128	1.331	70.785	0.27468	0.18	19.8	-
25579_5	114814	254.231233790	-53.009995184	20.145	20.867	1.211	1.289	70.633	0.27468	0.10	26.6	-
22858_8	181698	254.935595619	-53.092261880	19.116	20.047	1.456	1.071	70.613	0.27522	0.46	23.8	-
04767_5	99563	254.347305721	-53.038700101	21.236	22.010	0.497	1.305	70.688	0.27588	0.43	25.1	-
10921_6	128060	254.540700309	-53.038843985	18.633	19.664	–	1.376	70.727	0.27660	0.38	21.5	-
13954_5	106036	254.188397552	-52.917400293	20.538	21.449	–	1.450	70.750	0.27690	0.31	24.6	-
04477_2	26592	254.756677394	-52.757145120	18.151	18.695	0.921	1.146	70.625	0.27757	0.04	3.0	-
17967_4	84685	254.320302397	-52.794576116	19.781	20.475	–	1.366	70.633	0.27844	0.14	17.2	-
24174_8	182721	254.954516785	-52.873782213	20.536	21.338	1.291	1.553	70.656	0.27887	0.12	12.0	-
04862_5	99625	254.395462830	-53.034422041	20.149	20.973	0.690	1.535	70.758	0.27940	0.29	23.8	-
25118_8	183375	254.917789153	-53.006490681	16.532	17.116	0.950	1.141	70.852	0.27953	0.04	18.7	-
06738_7	149236	254.828849758	-52.994736248	18.331	19.058	0.899	1.151	70.777	0.28038	0.44	17.3	-
01274_3	47236	254.606339616	-52.627061589	20.541	21.306	0.902	1.441	70.711	0.28168	0.30	7.7	-
07508_8	170496	255.025345114	-52.956616847	21.085	22.030	0.484	1.720	70.855	0.28180	0.39	17.5	-
04611_2	26697	254.803852000	-52.755101207	18.478	19.120	1.052	1.347	70.684	0.28199	0.02	3.1	10*
16816_7	158279	254.682206684	-52.850485318	18.375	19.446	1.054	1.597	70.828	0.28241	0.48	9.1	-
21127_7	162062	254.863729933	-53.027442869	20.169	21.013	–	1.308	70.809	0.28269	0.27	19.4	-
13285_5	-	254.189086242	-52.950699282	20.759	21.889	1.920	1.165	70.785	0.28280	0.73	25.6	-
16392_8	176839	255.070869741	-53.089147343	19.690	20.420	1.317	1.475	70.766	0.28296	0.07	25.3	-
14428_7	156121	254.709596025	-52.883895287	20.591	20.920	0.680	0.586	70.594	0.28400	0.17	10.8	-
26310_1	18660	255.006830138	-52.776013180	20.568	21.468	–	1.411	70.637	0.28402	0.27	9.5	-

Table A.2. continued.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$R_{\max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
15906_5	107493	254.316902665	-53.047023021	19.467	20.264	–	1.244	70.605	0.28511	0.18	26.1	-
09914_1	7211	254.964750204	-52.662654779	17.972	18.661	1.247	1.147	70.582	0.28650	0.17	7.6	-
00564_2	23439	254.689745025	-52.812725870	20.204	20.735	1.101	1.145	70.586	0.28755	0.07	6.9	-
00920_4	71955	254.346375967	-52.744068157	20.395	21.021	1.219	1.253	70.859	0.28946	0.20	15.6	-
20677_3	62838	254.492505324	-52.710053020	19.043	19.731	0.879	1.376	70.605	0.28960	0.07	10.1	-
17050_5	108433	254.187345679	-52.922566141	17.792	18.614	1.416	1.381	70.852	0.29009	0.16	24.8	-
10327_5	103345	254.304388564	-52.837394359	19.669	20.494	1.016	1.445	70.711	0.29131	0.06	18.6	-
17881_1	13017	254.978283024	-52.780450749	19.195	20.085	1.209	1.614	70.695	0.29140	0.16	8.7	-
08259_7	150602	254.678393127	-52.972856341	18.303	19.054	1.126	1.445	70.746	0.29159	0.13	16.2	-
10853_2	31606	254.800782797	-52.669356128	16.342	16.921	1.049	1.191	70.777	0.29340	0.02	2.6	78
17587_5	108881	254.395423185	-52.861345859	17.477	18.099	0.915	1.179	70.730	0.29340	0.03	16.4	-
08783_4	77784	254.235727730	-52.676265649	17.332	17.971	–	1.083	70.684	0.29376	0.26	19.6	-
08784_4	77785	254.235422632	-52.675982281	17.266	17.937	–	1.312	70.828	0.29389	0.52	19.6	-
17194_2	36595	254.750496117	-52.583899859	17.339	18.167	0.980	1.251	70.742	0.29400	0.28	7.5	-
12169_5	-	254.338174880	-53.010618311	16.699	–	–	–	70.613	0.29880	0.18	24.0	-
11470_2	32097	254.732189976	-52.661320715	19.952	20.448	1.056	0.973	70.836	0.29920	0.18	3.2	21*
10995_3	54399	254.556050142	-52.573817424	17.852	18.495	1.202	1.085	70.812	0.30060	0.12	11.2	-
13391_3	56428	254.447914190	-52.732154992	18.188	18.812	1.212	1.035	70.801	0.30160	0.12	11.8	-
07912_8	170778	254.983949207	-52.945043589	18.065	18.708	0.978	1.297	70.746	0.30210	0.02	16.2	-
27652_4	91644	254.240749806	-52.557791434	18.963	19.694	1.014	1.074	70.637	0.30244	0.25	21.3	-
22508_4	88253	254.244886863	-52.663510897	16.833	17.445	1.010	1.109	70.648	0.30281	0.07	19.3	-
19339_7	160504	254.649660635	-52.994202670	21.698	–	–	–	70.867	0.30368	0.46	17.7	-
10725_1	7808	254.901173022	-52.650253888	20.758	21.382	0.757	1.530	70.863	0.30368	0.51	5.9	-
19340_7	160505	254.649638905	-52.993842956	20.605	21.552	–	1.599	70.867	0.30380	0.38	17.7	-
19697_5	110349	254.214057879	-52.963919052	19.300	20.538	–	1.467	70.617	0.30521	0.81	25.3	-
21383_4	87435	254.319088349	-52.736526993	19.148	19.920	0.872	1.439	70.707	0.30524	0.19	16.5	-
22513_5	112507	254.234972136	-52.966147033	19.396	20.253	1.202	1.385	70.883	0.30529	0.26	24.8	-
22157_6	136402	254.421896732	-52.910342705	18.641	19.596	2.046	1.014	70.598	0.30556	0.63	17.5	-
21382_4	87434	254.318840646	-52.736913998	20.015	20.617	–	1.111	70.695	0.30556	0.16	16.5	-
05440_5	100023	254.224185244	-53.012348345	20.627	21.306	0.896	1.192	70.707	0.30660	0.50	26.9	-
21824_4	87765	254.318235592	-52.709012413	19.182	19.749	0.853	1.042	70.734	0.30689	0.07	16.5	-
08066_7	150425	254.715816549	-52.975616766	18.681	19.538	1.048	1.372	70.703	0.30749	0.62	16.2	-
13423_5	105639	254.221047783	-52.942533166	20.551	21.175	–	1.320	70.695	0.30801	0.32	24.4	-
12151_4	80262	254.349887455	-52.569271440	18.229	18.979	1.187	1.318	70.695	0.30822	0.36	17.4	-
14807_4	82276	254.225451952	-52.697557050	19.740	20.480	1.088	1.456	70.785	0.30831	0.10	19.8	-
19512_1	14092	254.996764615	-52.730397444	20.267	21.500	–	2.527	70.844	0.30875	0.13	8.3	-
01798_1	1337	255.001913944	-52.791369324	18.769	19.053	0.887	0.984	70.812	0.30880	0.40	9.8	-
16316_4	83395	254.217845514	-52.621394994	19.644	20.705	–	1.744	70.785	0.30898	0.66	20.8	-
12190_1	8868	254.994115903	-52.627062314	18.668	19.402	1.189	1.317	70.742	0.30906	0.07	9.5	-
16315_4	83394	254.217424582	-52.621579239	19.660	20.400	–	1.190	70.785	0.30906	0.34	20.8	-
19951_1	14390	254.885039086	-52.717894694	19.449	19.680	0.949	1.026	70.645	0.31080	0.51	4.2	-
19810_5	110430	254.328920371	-52.957442988	19.075	19.753	–	1.167	70.727	0.31109	0.11	21.9	-
12499_3	55658	254.517104800	-52.572446723	19.442	20.243	1.619	1.269	70.871	0.31130	0.20	12.3	-
04359_6	123488	254.478616830	-53.073251059	17.928	19.183	0.812	1.830	70.746	0.31170	0.67	24.3	-
09421_3	53054	254.608363918	-52.705663769	17.978	18.526	0.927	1.093	70.656	0.31190	0.01	5.9	-
23060_4	-	254.338603300	-52.631587563	18.379	19.175	0.710	1.468	70.594	0.31217	0.31	16.4	-
19643_6	134566	254.430114020	-52.932311144	18.590	19.340	0.872	1.448	70.754	0.31253	0.17	18.3	-
06428_3	50599	254.618804800	-52.588914684	15.704	16.347	1.175	1.054	70.680	0.31280	0.06	9.1	-
08440_3	52214	254.503980365	-52.796502540	19.977	20.829	1.127	1.346	70.699	0.31358	0.35	11.0	-
24391_5	113903	254.207795089	-52.957439694	17.811	18.527	0.962	1.214	70.586	0.31662	0.14	25.3	-
08362_3	52149	254.448301459	-52.803166466	18.299	18.855	0.917	1.120	70.816	0.31708	0.08	13.0	-
22265_6	136498	254.513875097	-52.887909622	19.618	20.242	0.896	1.109	70.598	0.31743	0.11	14.2	-
06418_7	148950	254.744593711	-52.999349552	19.456	20.137	1.037	1.178	70.809	0.31743	0.14	17.5	-
02948_2	25379	254.656955747	-52.778666883	19.030	20.255	–	1.679	70.688	0.31800	0.65	5.9	-
22465_7	163128	254.834031716	-52.879243185	18.140	18.882	0.931	1.282	70.656	0.31812	0.38	10.5	-
01441_3	-	254.593792646	-52.819448864	17.037	17.592	0.836	1.133	70.672	0.32030	0.03	9.3	-
09135_1	6637	254.969512257	-52.675473304	18.815	19.742	1.669	1.595	70.773	0.32110	0.66	7.5	-
26855_6	139760	254.471043915	-53.064227483	16.471	17.110	1.058	1.259	70.785	0.32233	0.03	24.0	-
27351_6	-	254.462803207	-52.879618613	17.840	18.732	1.334	1.142	70.891	0.32240	0.73	15.2	-
12869_5	105234	254.262110159	-52.971095051	18.995	19.687	0.865	1.146	70.602	0.32243	0.26	24.3	-
24512_4	89578	254.337530845	-52.555765616	18.176	18.880	0.894	1.426	70.812	0.32315	0.36	18.2	-
07369_6	125599	254.435902117	-52.938528796	20.993	21.739	–	1.075	70.727	0.32318	0.54	18.4	-
18093_8	178231	254.982715285	-52.908115965	20.789	21.711	1.109	1.621	70.738	0.32338	0.21	14.2	-
22091_7	-	254.771066385	-53.060847905	16.268	17.434	1.099	1.517	70.688	0.32533	0.41	21.2	-
22576_6	136743	254.499200291	-52.828093517	19.449	20.119	1.171	0.963	70.648	0.32801	0.26	12.2	-
24316_8	182809	254.993242376	-52.848196314	17.734	18.665	0.655	1.531	70.867	0.32875	0.29	11.6	-

Table A.2. continued.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$R_{\rm max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
12347_4	80409	254.338135370	-52.562761802	18.107	19.099	0.616	1.694	70.688	0.33057	0.46	18.0	-
11806_5	104429	254.343834208	-53.030153628	20.690	21.442	1.324	1.082	70.746	0.33164	0.25	24.7	-
15757_3	58488	254.492893426	-52.687986583	18.939	19.722	0.996	1.607	70.871	0.33170	0.22	10.2	-
14706_7	156370	254.680160208	-52.879691196	18.674	19.302	0.889	1.146	70.836	0.33554	0.08	10.8	-
22292_7	-	254.768480955	-52.966907452	17.198	17.741	0.876	1.107	70.906	0.33626	0.02	15.5	-
01904_7	144924	254.709172644	-53.066554586	18.174	18.698	0.783	1.034	70.617	0.33660	0.03	21.6	-
07691_1	5595	255.046867161	-52.697552953	19.307	19.711	0.779	1.123	70.637	0.33720	0.40	10.1	-
07252_1	5281	254.939664193	-52.704861194	17.917	18.677	1.038	1.120	70.684	0.33760	0.21	6.1	-
06503_2	28181	254.822636962	-52.728735032	18.271	18.952	0.992	1.239	70.816	0.33800	0.12	2.2	-
11458_7	153458	254.766357845	-52.927098037	18.639	19.292	1.180	1.044	70.828	0.33876	0.20	13.1	-
20307_3	62507	254.484037154	-52.570822061	20.548	21.297	–	1.344	70.703	0.33897	0.18	13.3	-
27138_8	184766	255.089414723	-52.990331243	18.288	18.980	1.010	1.337	70.738	0.33925	0.06	20.5	-
05452_4	75369	254.336213743	-52.762560934	19.726	20.477	0.965	1.122	70.664	0.34242	0.48	16.1	-
05451_4	75368	254.335951934	-52.762955398	20.007	20.620	0.897	1.146	70.832	0.34260	0.18	16.1	-
10096_3	-	254.540008213	-52.645514980	18.015	18.570	0.995	1.178	70.742	0.34417	0.02	9.2	-
26137_6	139229	254.415882883	-52.865801132	17.879	18.554	0.890	1.062	70.652	0.34417	0.24	16.0	-
17155_5	108526	254.359582622	-52.910476297	18.097	18.701	1.269	1.041	70.895	0.34570	0.47	19.2	-
28186_6	140556	254.491407239	-53.032719555	19.093	19.528	0.576	0.997	70.863	0.34605	0.23	21.9	-
27768_6	140360	254.491047324	-53.032420233	20.053	20.975	–	1.482	70.863	0.34605	0.18	21.9	-
26985_4	91277	254.246374501	-52.639884471	19.102	19.974	0.700	1.371	70.645	0.34670	0.42	19.5	-
27919_8	-	254.897747725	-52.941862069	18.087	–	–	–	70.715	0.34675	0.05	14.7	-
10974_3	54379	254.609000461	-52.576231858	18.927	19.640	0.630	1.328	70.824	0.34737	0.12	9.9	-
03079_1	2271	254.891186992	-52.771171402	16.672	17.416	1.177	1.026	70.918	0.34880	0.39	5.8	-
11224_3	54584	254.531633927	-52.556487354	17.435	18.313	0.849	1.477	70.773	0.35070	0.22	12.6	-
13453_2	33652	254.749854995	-52.635114927	18.696	19.397	0.546	1.182	70.773	0.35110	0.37	4.5	-
05955_8	169516	254.896728284	-53.003568782	18.449	19.247	0.694	1.462	70.617	0.35269	0.37	18.3	-
11447_6	128466	254.442639378	-53.009900596	19.755	20.846	–	2.030	70.699	0.35321	0.13	21.6	-
11448_6	128467	254.442134836	-53.009818719	19.535	20.199	0.964	1.015	70.691	0.35321	0.31	21.7	-
09336_3	52979	254.529667849	-52.713433499	17.533	18.111	0.992	1.159	70.656	0.35394	0.02	8.8	-
08392_4	77501	254.220737595	-52.686390467	18.134	18.750	0.943	1.128	70.848	0.35466	0.06	20.0	-
21923_3	63947	254.504937968	-52.631010095	19.104	19.729	1.145	1.001	70.855	0.35533	0.14	10.7	-
00208_2	23152	254.686223163	-52.817947839	19.619	20.168	1.193	0.952	70.828	0.35610	0.34	7.3	-
10059_1	7319	254.920454995	-52.660442108	19.028	19.852	1.274	1.613	70.609	0.35807	0.05	6.2	-
19972_6	134801	254.616919029	-52.906797089	16.008	16.882	0.777	0.976	70.605	0.35980	0.32	13.2	-
20779_2	39439	254.704327110	-52.752044026	19.325	20.011	–	1.341	70.801	0.36025	0.07	3.6	-
26844_2	44042	254.703828421	-52.752317599	19.283	–	–	–	70.617	0.36040	0.27	3.6	-
04843_2	26875	254.703732090	-52.752045346	18.347	18.828	0.669	1.065	70.617	0.36040	0.06	3.6	-
02366_2	24892	254.828122494	-52.786876736	17.069	17.982	0.524	1.258	70.594	0.36350	0.31	5.2	35
18198_2	37373	254.767763709	-52.570555913	18.852	19.231	0.973	0.772	70.746	0.36420	0.23	8.3	-
14498_3	57391	254.547669842	-52.607442216	18.984	19.601	1.048	1.195	70.582	0.36442	0.02	10.1	-
15649_2	35395	254.715967973	-52.605379815	20.945	21.419	1.072	1.088	70.770	0.36516	0.29	6.5	-
03734_2	25997	254.717966350	-52.767671746	18.913	19.469	1.151	0.683	70.863	0.36742	0.37	4.0	-
09173_6	126796	254.575157626	-52.860885650	19.226	19.919	1.890	0.632	70.863	0.36742	0.61	11.6	-
11723_4	79958	254.246993791	-52.581809258	19.820	20.458	–	1.017	70.863	0.36856	0.25	20.5	-
11724_4	79959	254.246986926	-52.581468158	20.036	20.747	–	1.351	70.852	0.36933	0.09	20.5	-
10805_2	31566	254.770365377	-52.670201471	17.518	18.728	0.563	1.613	70.773	0.37090	0.44	2.3	32*
05435_3	49849	254.560369896	-52.682548310	17.831	18.476	1.525	1.149	70.773	0.37428	0.19	7.8	-
18276_5	-	254.219326302	-53.066447529	17.307	18.000	0.925	1.250	70.934	0.37490	0.16	29.3	-
16373_2	35981	254.706076807	-52.595253819	19.469	19.963	0.566	0.961	70.746	0.37550	0.10	7.2	-
06644_3	50758	254.547645129	-52.571893158	16.747	17.060	0.934	1.098	70.707	0.37692	0.25	11.5	-
18759_2	37799	254.706738050	-52.563088681	19.027	19.561	0.963	1.108	70.852	0.37820	0.26	9.0	-
27434_6	140156	254.562555074	-53.066982469	15.524	16.370	0.747	1.139	70.582	0.38040	0.25	22.8	-
08822_2	29999	254.838242409	-52.696195209	18.089	18.757	0.894	1.072	70.855	0.38304	0.21	2.6	50*
01618_8	166802	254.995306476	-52.972041138	19.403	20.072	0.999	1.304	70.953	0.38574	0.06	17.8	-
21319_5	111571	254.256204924	-52.853877594	17.944	18.364	0.904	0.677	70.656	0.38660	0.19	20.6	-
20050_6	134857	254.444138369	-52.900008086	17.688	18.352	0.828	1.216	70.742	0.38670	0.07	16.5	-
01015_2	23797	254.782447929	-52.805883546	15.462	15.969	0.874	1.036	70.637	0.38720	0.05	5.9	22
11185_6	128277	254.573301030	-53.025133073	17.104	17.567	1.276	0.784	70.641	0.38830	0.27	20.3	-
09984_6	127336	254.613073315	-53.087164399	18.571	19.032	1.072	0.849	70.812	0.38944	0.25	23.4	-
24135_2	42181	254.653419453	-52.570100641	20.636	21.272	1.253	1.336	70.648	0.39393	0.14	9.3	-
25832_5	115016	254.211194018	-52.941338750	15.564	16.213	0.963	0.867	70.777	0.39460	0.28	24.6	-
19024_2	38007	254.705000282	-52.559692052	16.174	16.623	0.874	0.905	70.805	0.39520	0.12	9.2	-

Table A.2. continued.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$R_{\rm max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
22442_6	136638	254.412274265	-52.852975207	16.488	17.114	0.835	1.064	70.859	0.39560	0.17	15.6	-
26667_1	18889	254.885399844	-52.742269102	18.648	19.550	–	1.361	70.867	0.39570	0.58	4.6	-
09705_5	102913	254.311160614	-52.863616385	17.733	18.411	0.989	1.028	70.766	0.39580	0.20	19.1	-
19141_1	13846	254.885985663	-52.742281281	18.067	18.581	0.668	1.034	70.867	0.39600	0.12	4.7	-
16340_3	58983	254.476023156	-52.582845258	18.017	18.611	1.007	1.144	70.602	0.39879	0.02	13.1	-
25157_4	90082	254.202818136	-52.705717378	18.979	19.808	1.311	1.119	70.910	0.40259	0.39	20.7	-
21625_5	111806	254.291931309	-52.834112830	16.542	17.058	0.825	1.006	70.840	0.40460	0.02	18.9	-
15046_2	34918	254.699144675	-52.613789414	17.642	18.142	0.933	1.042	70.867	0.40700	0.05	6.2	26*
17495_8	177748	254.985955392	-52.974806527	18.352	19.182	0.483	1.297	70.934	0.40941	0.28	17.8	-
17494_8	177747	254.986125622	-52.975164206	18.792	19.634	1.009	1.386	70.934	0.40941	0.27	17.8	-
22996_7	-	254.745106379	-52.879941791	17.804	18.130	1.049	1.283	70.582	0.41208	0.11	10.3	-
19322_4	85816	254.234085210	-52.649491822	16.975	17.568	1.020	0.974	70.734	0.41902	0.22	19.8	-
09623_5	-	254.352159918	-52.866704418	15.372	16.410	0.218	1.103	70.887	0.43070	0.39	17.9	-
05189_3	-	254.559975215	-52.708303957	17.013	17.399	0.615	0.907	70.926	0.43174	0.02	7.7	-
13354_5	105585	254.251461887	-52.947111697	15.176	15.668	0.841	0.880	70.730	0.43294	0.42	23.7	-
17580_7	158958	254.813734020	-52.839904305	15.489	16.359	0.489	1.207	70.887	0.43654	0.35	8.0	-
25202_5	114523	254.187425677	-52.835291812	16.418	16.874	0.993	0.948	70.715	0.44165	0.15	22.5	-
20160_4	86494	254.377213946	-52.564693281	18.852	19.379	0.670	0.811	70.781	0.44334	0.26	16.7	-
04424_1	3269	254.935284558	-52.749949277	18.511	19.008	0.814	0.886	70.758	0.44540	0.13	6.5	-
16369_6	-	254.552371421	-52.915766158	18.146	18.601	0.681	0.991	71.000	0.46310	0.04	14.8	-
13288_2	33521	254.673007553	-52.637555967	14.807	15.444	1.291	0.955	70.867	0.47290	0.44	5.5	3
26552_1	-	254.883268519	-52.754444185	17.318	17.894	0.947	1.186	70.613	0.48143	0.02	4.9	-
22792_3	-	254.611378346	-52.580077511	15.963	16.663	0.630	1.383	70.715	0.48331	0.02	9.6	-
20282_5	110778	254.322148683	-52.920441546	20.278	21.428	1.183	1.787	70.637	0.48500	0.32	20.7	-
23188_2	41404	254.656188433	-52.616197780	14.464	14.928	0.751	0.923	70.594	0.49680	0.32	6.9	87
08194_3	52008	254.423042597	-52.819179302	17.645	17.972	0.742	0.794	70.895	0.53286	0.04	14.3	-
22683_1	16175	254.912163509	-52.638341931	18.437	18.721	0.812	0.665	70.855	0.54980	0.23	6.6	-
13392_6	129921	254.607202775	-52.908718766	16.630	17.133	0.703	0.915	70.715	0.56887	0.11	13.4	-
11558_6	128543	254.419774275	-53.006271316	18.530	19.618	1.695	2.151	70.746	0.58819	0.14	21.9	-
09620_1	6991	254.928346593	-52.667625700	15.648	16.040	0.733	0.825	70.668	0.60980	0.10	6.2	-
00188_1	146	255.016269835	-52.817142011	18.327	18.955	1.136	1.258	71.051	0.64075	0.09	11.0	-
21660_4	87641	254.317024577	-52.720413661	20.566	21.519	1.400	1.478	71.215	0.63885	0.31	16.5	-
04892_3	49453	254.498055760	-52.735519519	16.160	16.625	1.016	1.010	71.023	0.64834	0.06	10.0	-
10609_2	31412	254.862412733	-52.672477743	17.611	18.064	0.716	0.940	70.828	0.8316	0.14	4.0	58*
15261_1	11141	255.068295962	-52.576301385	17.344	17.955	0.896	1.286	70.695	0.8830	0.04	13.4	-

Table A.3. Detached systems, β Per (Algol) type (EA) systems.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$R_{\max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
21471_1	15395	255.017261399	-52.673015599	21.199	–	–	–	70.648	0.25051	0.86	9.2	-
21839_2	-	254.800351011	-52.691146980	22.995	–	–	–	70.598	0.25290	1.33	1.5	-
25622_1	18191	255.016637408	-52.559069751	20.972	21.863	1.266	1.657	70.621	0.26185	0.51	12.7	-
06097_8	169599	254.909122586	-52.998979068	20.318	21.536	–	1.888	70.844	0.27033	0.77	18.1	-
00918_4	71954	254.224257122	-52.743926019	20.481	21.772	–	2.829	70.734	0.28087	0.31	20.0	-
10274_1	7474	255.048593809	-52.656918798	17.406	17.994	0.990	1.223	70.695	0.31380	0.03	10.6	-
19873_1	14344	255.075735833	-52.720109603	21.198	22.435	–	2.534	70.625	0.31840	0.54	11.1	-
02749_1	2022	254.997523924	-52.776403366	20.313	21.331	1.269	–	70.914	0.34670	0.60	9.2	-
21594_4	87592	254.326599726	-52.724909290	18.588	19.615	1.102	1.840	70.961	0.38744	0.52	16.2	-
26180_4	90782	254.247851409	-52.796401894	20.325	21.216	–	1.701	70.801	0.39019	0.60	19.7	-
23415_5	113232	254.331875018	-53.089304114	20.261	21.598	–	3.018	70.637	0.39411	0.47	27.8	-
16368_8	-	254.941571694	-53.093099122	18.420	19.074	1.008	1.387	70.707	0.41166	0.04	23.9	-
15307_2	35129	254.830423589	-52.609980387	18.574	19.654	1.706	2.588	70.707	0.44900	0.27	6.3	43*
05088_8	169008	255.008837955	-53.030705813	19.839	20.776	1.349	1.738	70.801	0.45707	0.32	21.2	-
16525_8	176950	254.954548581	-53.074149215	19.822	20.435	1.019	1.454	70.727	0.49625	0.29	22.9	-
09161_2	30259	254.800143085	-52.691547335	19.384	20.527	2.125	2.367	70.859	0.50611	0.69	1.5	-
17502_2	36826	254.750395425	-52.579915829	20.927	22.030	–	2.596	70.855	0.54690	0.44	7.7	-
23787_1	-	255.086281115	-52.605776551	22.709	–	–	–	70.625	0.60500	0.91	13.0	-
16725_2	36241	254.763191785	-52.590126207	19.220	19.918	1.206	1.414	70.945	0.61370	0.31	7.1	51*
23781_1	16924	255.086851773	-52.605912868	19.954	20.717	1.329	1.495	70.629	0.60540	0.30	13.0	-
04015_8	168422	255.081849014	-53.073462004	20.996	22.309	–	2.539	70.734	0.64884	0.52	24.6	-
25809_8	183819	254.928791040	-52.871773121	14.842	15.300	0.742	0.905	71.086	0.66067	0.11	11.4	-
19258_2	38184	254.698073311	-52.556586169	16.232	16.705	0.879	1.066	71.152	0.66468	0.01	9.5	-
19192_2	38138	254.706610743	-52.557441173	16.335	16.732	0.744	0.914	70.816	0.66606	0.01	9.4	-
06539_2	28209	254.653146758	-52.728429918	17.968	18.775	1.126	1.477	70.727	0.68230	0.19	4.4	-
22574_2	40890	254.839652516	-52.650662434	18.314	18.783	0.569	0.858	70.922	0.68170	0.51	4.3	40*
23313_4	88780	254.275015010	-52.619040328	18.097	18.925	1.176	1.453	71.031	0.69761	0.48	18.8	-
28980_1	20459	255.057333782	-52.738614108	20.906	21.667	–	1.391	70.891	0.73148	0.39	10.6	-
01866_2	24487	254.653965066	-52.793810375	15.769	16.343	0.853	0.897	70.883	0.85120	0.53	6.7	0
11762_4	79983	254.318759486	-52.581256371	21.279	22.243	–	1.450	70.926	0.86812	0.60	18.1	-
04861_8	168880	254.993968428	-53.039171477	15.044	15.559	0.736	0.864	70.746	0.90924	0.38	21.4	-
26784_8	-	255.081360466	-53.089158714	18.167	18.618	0.844	0.954	71.309	0.90880	0.18	25.5	-
26355_8	184177	255.098263754	-52.993918503	20.231	21.496	–	2.555	71.168	0.93471	0.26	20.8	-
23942_2	42020	254.713099225	-52.579241336	20.083	20.598	0.857	1.132	71.617	1.05465	0.08	8.0	-
27820_8	185233	255.029395619	-53.087130881	19.499	20.505	–	1.900	70.812	1.16242	0.37	24.6	-
07143_4	76597	254.368270334	-52.719769345	14.554	15.003	0.910	0.861	71.289	1.21055	0.15	14.6	-
13070_2	33353	254.840405362	-52.640163459	19.171	19.719	0.943	1.179	71.680	1.2424	0.30	4.8	-
09324_4	78183	254.392031643	-52.661470120	20.596	21.768	–	2.333	71.809	1.2979	0.18	14.1	-
18145_1	13187	254.910993382	-52.772099489	20.103	20.977	1.287	1.544	71.453	1.3306	0.38	6.4	-
13414_8	174607	254.946603965	-52.994282697	18.218	18.793	0.910	1.141	70.734	1.3531	0.15	18.3	-
06441_8	169808	254.906000630	-52.988027454	21.352	21.832	–	1.531	71.828	1.4186	0.47	17.5	-
09471_8	171895	254.964382916	-52.896065953	14.733	15.260	0.845	1.047	71.703	1.4687	0.02	13.3	-
25420_6	138746	254.432248297	-53.067207957	17.993	18.753	1.284	1.385	71.047	1.5530	0.25	24.8	-
08541_6	126376	254.518259628	-52.889120371	14.441	14.919	0.810	0.964	71.004	1.5896	0.02	14.2	-
20077_7	161149	254.813902734	-52.906880213	18.541	19.413	–	0.603	70.738	1.6016	0.56	12.0	-
03685_4	74090	254.340296069	-52.810255408	17.827	18.464	0.986	1.184	71.129	1.6143	0.34	16.8	-
04601_1	3387	254.986266354	-52.747272966	18.870	19.686	1.316	1.522	71.828	1.6477	0.73	8.2	-
27270_4	91435	254.240908904	-52.603862690	19.017	19.833	1.040	1.344	71.449	1.6687	0.54	20.3	-
19297_4	85797	254.393808310	-52.651389139	17.894	18.420	0.749	0.999	72.008	1.6883	0.38	14.1	-
09235_8	171720	255.015270100	-52.902598679	20.206	20.899	1.114	1.243	72.266	1.7754	0.54	14.6	-
10340_2	31195	254.706854237	-52.676396811	15.894	16.397	0.920	1.103	72.051	1.8156	0.02	3.0	38
18972_5	109822	254.280926335	-53.016274254	17.332	18.047	0.926	1.132	71.656	1.8458	0.60	25.6	-
16769_8	177150	254.954720283	-53.047084354	18.905	19.400	0.853	1.154	72.555	2.0715	0.31	21.4	-
13573_2	33743	254.812702563	-52.633378426	16.518	17.003	0.873	1.027	71.039	2.3016	0.34	4.7	8
25223_5	114538	254.376854847	-52.832836423	18.368	19.266	1.130	1.519	72.270	2.3134	0.28	16.1	-
18853_2	37870	254.821989999	-52.561757998	20.125	21.214	1.470	2.068	72.613	2.6531	0.75	9.0	-
19466_4	85930	254.205093525	-52.634301683	18.845	19.616	1.088	1.379	71.688	2.6619	0.30	21.1	-
27374_8	184932	254.953992006	-52.870003666	18.837	19.562	1.094	1.438	72.004	3.7709	0.14	11.8	-
15577_2	35339	254.696724869	-52.606403320	18.945	19.457	0.994	1.155	72.207	3.7955	0.17	6.7	-

Table A.4. Semi–detached systems, β Lyr type (EB) systems.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$R_{\rm max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
00145_2	23102	254.732762682	-52.818849796	16.494	17.223	1.228	1.198	70.676	0.29110	0.26	6.8	0
25252_3	66936	254.610787192	-52.641122153	20.364	21.152	1.477	1.395	70.867	0.30780	0.17	7.1	-
08123_2	29437	254.789360265	-52.705813364	19.884	20.992	1.385	2.252	70.883	0.31903	0.15	0.7	-
26817_4	91189	254.184162106	-52.661447237	17.866	18.505	1.117	1.061	70.586	0.35828	0.25	21.5	-
14546_3	57436	254.563351483	-52.600862382	19.342	20.148	1.710	1.023	70.766	0.35970	0.31	9.9	-
08031_6	126032	254.470482102	-52.910112033	16.846	17.107	0.908	1.023	70.836	0.38200	0.71	16.3	-
00404_5	96551	254.340899627	-53.063693904	17.688	18.366	0.523	1.202	70.602	0.38541	0.34	26.4	-
02944_2	25375	254.850570081	-52.778327877	14.636	15.080	0.658	0.837	70.766	0.42730	0.37	5.1	0
22426_6	136623	254.517209930	-52.857563834	19.344	20.014	1.182	1.383	70.711	0.43650	0.33	12.8	-
03930_4	74263	254.379951370	-52.804259344	15.918	16.494	0.743	0.943	70.781	0.45089	0.39	15.3	-
16994_7	-	254.677512807	-52.847955600	18.923	19.371	0.955	0.916	70.793	0.51878	0.40	9.0	-
18865_6	133995	254.580058548	-52.988929821	15.350	16.161	0.716	1.133	70.703	0.5466	0.60	18.2	-
11754_1	8551	255.015627194	-52.634106535	16.694	16.855	0.708	0.603	70.785	0.5589	0.27	10.0	-
05980_6	-	254.424929342	-53.002537672	16.288	16.783	0.785	0.904	70.785	0.6253	0.12	21.6	-
27172_5	116076	254.325348902	-52.829020426	16.774	17.402	0.963	1.112	70.629	0.6669	0.39	17.7	-
03430_1	2533	254.944906222	-52.765747139	16.293	16.731	0.545	0.778	71.098	0.7232	0.30	7.2	-
19284_2	38202	254.657162405	-52.556236396	15.657	16.385	0.561	1.161	70.746	0.7734	0.21	10.0	-
07509_4	76854	254.341608335	-52.710086274	18.130	18.832	0.972	1.239	71.172	0.8018	0.20	15.6	-
00447_2	23345	254.692572518	-52.814330671	17.050	17.552	0.910	0.913	70.777	0.9161	0.38	7.0	-
11432_5	104162	254.361735473	-53.051231155	17.781	18.263	0.786	0.913	71.738	1.1724	0.18	25.3	-
28423_8	-	254.914870284	-52.897314871	16.674	17.667	1.486	2.045	70.805	2.1396	0.06	12.5	-
15861_1	11573	255.004958117	-52.566742468	15.552	16.461	1.400	1.755	72.582	2.3596	0.05	12.0	-

Table A.5. RS CVn variables, binary systems showing stellar activity in one or both components.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$R_{\rm max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
25516_5	114763	254.273572732	-53.026533926	16.260	16.866	0.838	1.090	70.855	–	0.03	26.2	-
02582_7	145527	254.864316020	-53.055976199	18.615	19.343	1.072	1.358	–	–	0.08	21.1	-
20346_3	62538	254.569287024	-52.559414721	19.054	19.821	1.257	1.399	70.844	0.47060	0.06	11.6	-
06395_3	50575	254.482527337	-52.591344638	17.001	17.755	1.197	1.326	70.871	0.55286	0.06	12.6	-
20136_7	-	254.740335529	-52.899048326	17.113	17.736	0.919	1.173	70.902	0.58741	0.04	11.5	-
21621_2	40116	254.717348621	-52.703470989	19.822	20.734	1.012	1.578	70.805	0.62880	0.29	2.0	-
24631_4	89653	254.208153599	-52.816075378	17.063	17.845	1.227	1.359	70.930	0.80689	0.24	21.4	-
05247_5	99886	254.383492354	-53.021274783	16.138	16.684	0.535	0.917	71.363	1.01202	0.13	23.4	-
21527_6	135894	254.514764282	-53.031843150	16.753	17.494	1.199	1.355	70.887	1.046	0.28	21.5	-
01907_2	24521	254.716587337	-52.793218076	16.632	17.271	1.015	1.260	71.352	1.342	0.15	5.5	0
25070_2	-	254.813983216	-52.738528086	18.513	19.219	–	1.540	71.953	1.4553	0.06	2.4	-
26281_4	90860	254.331281389	-52.770045725	17.732	18.644	1.259	1.693	71.699	1.7669	0.07	16.4	-
12708_1	9263	255.088952114	-52.618055564	18.029	19.107	1.432	1.950	71.770	2.0095	0.04	12.8	-
26902_2	44079	254.760879590	-52.738914968	14.599	15.081	0.843	1.024	72.090	2.1805	0.05	1.9	90
15961_5	107542	254.225911765	-53.041530079	17.048	17.827	1.091	1.362	71.711	2.1952	0.13	28.1	-
05622_3	-	254.465419081	-52.666844991	17.209	17.789	0.892	1.172	71.500	2.294	0.02	11.4	-
12979_1	9465	255.081803452	-52.613892774	14.512	14.968	0.764	0.913	70.738	3.309	0.02	12.7	-
26602_8	184362	254.962161815	-52.878228694	17.227	18.099	1.296	1.661	71.496	5.261	0.12	12.3	-

Table A.6. Single–wave rotational variables (RO1).

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$\overline{R}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
02849_5	98253	254.354170197	-52.871187225	14.559	15.082	0.792	0.989	70.805	0.34014	0.03	18.0	-
08107_3	51940	254.473655174	-52.562349360	18.548	19.122	0.908	1.132	70.648	0.34119	0.01	13.9	-
26178_5	115311	254.352916128	-52.832609795	19.503	19.605	0.304	0.474	70.723	0.37428	0.08	16.9	-
27582_2	-	254.733590738	-52.598549138	21.301	21.738	1.064	1.359	70.762	0.35688	0.34	6.7	-
07149_3	51134	254.479383519	-52.749951068	17.269	17.713	0.766	0.958	70.965	0.51898	0.01	10.9	-
00729_1	540	254.953916575	-52.807941793	17.573	18.156	1.013	1.213	71.082	0.5684	0.03	8.9	-
05640_1	4131	255.021070972	-52.731152223	17.279	18.147	1.340	1.791	70.977	0.5781	0.04	9.2	-
12434_1	9051	254.941320708	-52.622820545	18.647	19.365	1.246	1.473	70.945	0.6393	0.11	8.1	-
25160_6	138565	254.434291071	-52.868736345	18.610	19.313	1.179	1.449	70.984	0.6806	0.05	15.5	-
20185_4	86514	254.255951508	-52.561648405	18.979	19.804	1.193	1.738	71.188	0.72130	0.14	20.7	-
10203_3	53718	254.505967055	-52.637261376	17.788	18.928	1.709	2.886	70.836	0.77319	0.02	10.5	-
22278_2	40654	254.649579305	-52.665822056	19.457	20.440	1.604	2.026	70.988	0.86412	0.07	5.1	-
06932_2	28498	254.812770851	-52.722474381	17.550	18.151	1.072	1.347	70.688	0.90140	0.05	1.7	10*
06026_3	50300	254.537269269	-52.625449522	16.620	17.189	0.980	1.164	70.707	0.94535	0.02	9.8	-
04913_3	49473	254.567369728	-52.735127801	17.894	18.513	1.035	1.240	71.395	1.10089	0.04	7.6	-
09901_2	30842	254.732275735	-52.681556393	17.619	18.247	1.038	1.351	72.668	1.11842	0.08	2.1	-
19467_6	134432	254.604461352	-52.945500103	18.508	19.407	1.375	1.730	71.176	1.12347	0.08	15.5	-
15047_5	106844	254.307106128	-52.850872313	15.100	15.509	0.627	0.821	70.984	1.12287	0.02	18.9	-
30482_1	21276	255.067211585	-52.732384663	17.007	17.576	1.018	1.178	70.617	1.17801	0.03	10.9	-
30202_1	-	255.023845387	-52.626764953	17.032	17.626	1.034	1.214	70.676	1.19280	0.04	10.4	-
21207_1	15217	254.947667385	-52.682264108	19.367	20.202	1.273	1.631	70.875	1.18741	0.09	6.6	-
00455_2	23352	254.786845032	-52.814066276	19.023	19.914	1.496	1.862	70.949	1.21222	0.07	6.4	-
10610_4	79141	254.225546909	-52.619793701	16.422	16.938	0.841	1.017	71.734	1.26145	0.05	20.5	-
05605_3	49977	254.490079927	-52.668532089	16.421	16.930	0.956	1.115	71.324	1.26897	0.04	10.5	-
22750_5	112704	254.289670960	-52.927955662	17.938	18.748	1.406	1.518	71.664	1.3096	0.17	21.9	-
02729_4	73359	254.298182733	-52.595820650	14.944	15.498	0.921	1.116	71.434	1.3976	0.07	18.5	-
13347_3	56388	254.612367989	-52.738300695	19.284	19.884	0.984	1.263	71.086	1.4199	0.06	6.0	-
14911_2	34814	254.721536966	-52.615435459	17.702	18.299	1.053	1.212	70.902	1.5806	0.05	5.9	63*
05898_2	27723	254.717319402	-52.737366701	17.212	18.001	1.250	1.626	71.496	1.5866	0.06	2.6	53*
12587_6	129324	254.489031501	-52.952136798	18.000	18.829	1.253	1.646	71.531	1.5852	0.05	17.8	-
15454_8	176114	255.083656057	-52.873634937	20.236	21.249	–	2.102	70.941	1.6325	0.11	15.1	-
17345_7	158742	254.726800140	-52.843059212	20.084	20.960	1.251	1.631	71.570	1.6319	0.18	8.2	-
04644_3	49263	254.553372061	-52.760700665	17.530	18.204	1.059	1.347	72.188	1.6764	0.03	8.5	-
06406_3	50584	254.599018884	-52.588990782	17.193	18.071	1.312	1.696	72.031	1.7240	0.03	9.5	-
13548_3	56571	254.428913021	-52.714799761	18.818	19.534	1.152	1.523	71.711	1.7408	0.04	12.4	-
06236_1	4548	254.893544476	-52.721902773	16.148	16.614	0.865	0.972	72.207	1.7453	0.01	4.5	-
11977_1	8713	254.929865891	-52.630746475	16.185	16.592	0.749	0.849	71.188	1.8424	0.01	7.4	-
14603_2	34564	254.727584240	-52.619530090	18.860	19.425	1.029	1.239	72.031	1.9119	0.07	5.6	43*
03428_2	25755	254.720860351	-52.772076511	18.301	18.898	0.971	1.293	71.148	2.0797	0.05	4.2	4*
09775_2	30740	254.850965423	-52.683323748	17.484	18.182	1.118	1.482	72.156	2.1351	0.02	3.3	64*
15421_8	176092	254.897486841	-52.876889537	18.993	19.649	1.244	1.506	71.242	2.1447	0.10	11.1	-
04426_2	26545	254.860564128	-52.757735885	16.081	16.755	1.186	1.457	71.121	2.2510	0.24	4.4	0
17385_8	177659	255.093024071	-52.985125170	17.957	18.424	0.743	0.994	71.406	2.3477	0.04	20.3	-
08284_2	29558	254.747960284	-52.703847251	15.801	16.290	0.835	1.038	70.609	2.3890	0.05	0.9	-
12192_3	-	254.622922116	-52.632597618	18.166	18.830	1.053	1.368	71.918	2.4044	0.02	7.0	-
15936_6	131854	254.576130780	-52.964703071	17.502	18.210	1.163	1.421	70.734	2.4326	0.09	16.9	-
06272_6	124848	254.413081581	-52.989676986	18.252	18.844	1.128	1.205	71.496	2.5261	0.11	21.3	-
15378_6	131400	254.422785533	-53.031297478	17.439	18.035	0.965	1.174	72.266	2.6223	0.07	23.1	-
23010_5	112926	254.246880411	-52.882415824	15.583	16.168	0.868	1.116	72.203	2.690	0.04	21.7	-
27108_4	91341	254.230392047	-52.621914827	18.720	19.604	1.411	1.794	71.871	2.703	0.12	20.3	-
10372_2	31220	254.679930555	-52.675735040	17.650	18.317	1.080	1.456	72.957	2.735	0.04	3.8	26*
17835_8	178029	255.092737908	-52.937039226	14.862	15.333	0.772	0.940	71.543	2.782	0.04	18.0	-
05858_7	148443	254.738306416	-53.007005270	18.680	19.481	1.120	1.602	71.652	2.826	0.05	18.0	-
12388_4	80440	254.209935897	-52.560682667	14.901	15.417	0.864	1.056	71.496	2.887	0.02	22.3	-
07392_1	5378	254.904680899	-52.702647524	17.641	18.217	1.040	1.195	70.914	2.982	0.11	4.9	-
10199_7	152324	254.840494271	-52.944807129	16.754	17.555	1.244	1.546	70.738	3.031	0.04	14.4	-
10042_2	30960	254.772538141	-52.679593806	15.946	16.379	0.872	1.029	71.445	3.134	0.07	1.7	87
13461_1	9832	254.962830875	-52.606220233	15.034	15.459	0.791	0.886	71.523	3.100	0.01	9.3	-
15993_2	35676	254.846280438	-52.600497324	18.851	19.741	1.462	1.844	71.766	3.151	0.03	7.0	-
27870_8	185272	255.037584010	-53.031019154	18.442	19.313	–	1.831	71.664	3.158	0.05	21.6	-
11077_2	31786	254.861672278	-52.666238861	16.725	17.281	0.978	1.194	70.801	5.12	0.06	4.2	71
14568_1	10636	254.929608058	-52.587730244	15.164	16.005	1.122	1.616	75.906	–	0.13	9.3	-

Table A.7. Double–wave rotational variables (RO2).

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$\overline{R}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
12912_3	56017	254.533555002	-52.784475843	19.658	20.444	0.990	1.347	70.750	0.20639	0.07	9.8	-
04317_3	49008	254.608573445	-52.794792573	17.503	18.035	0.961	1.053	70.891	0.32733	0.03	7.8	-
07671_4	76978	254.335531957	-52.705889637	17.150	17.571	0.729	0.901	70.668	0.61286	0.03	15.8	-
06474_2	28156	254.756128298	-52.729271142	18.575	19.186	1.051	1.363	70.949	0.89900	0.06	1.4	9*
06387_2	28088	254.793146373	-52.730407627	15.970	16.476	0.937	1.130	71.191	0.92213	0.02	1.6	85
14557_3	57443	254.447228258	-52.600559305	19.027	20.148	1.753	2.378	70.828	0.95048	0.05	13.4	-
05167_3	49661	254.490080023	-52.710775679	16.300	16.647	0.626	0.746	70.637	1.03108	0.02	10.2	-
26964_5	115910	254.232273105	-52.879995622	15.669	16.302	0.884	1.200	71.410	1.22908	0.12	22.1	-
02033_8	167096	254.957256487	-52.945374763	15.467	15.955	0.670	1.060	70.906	1.590	0.09	15.7	-
08864_1	6430	255.028469607	-52.679450408	15.540	16.056	0.886	1.063	70.859	1.600	0.04	9.5	-
02131_1	1588	254.946929133	-52.786367467	19.053	20.007	1.239	1.889	71.059	1.8307	0.16	7.9	-
14272_8	175212	255.031414981	-52.944055117	16.372	16.886	0.859	1.033	72.906	2.4156	0.03	17.0	-
09463_7	151658	254.785621657	-52.955289040	14.720	15.184	0.806	0.938	72.711	2.7742	0.07	14.8	-
19539_8	179361	255.012367131	-53.058066501	14.733	15.184	0.730	0.913	70.793	3.204	0.04	22.7	-
13211_7	155014	254.827269769	-52.902388828	16.739	17.520	1.168	1.537	71.312	3.495	0.08	11.8	-

Table A.8. Long-period variables.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$\overline{R}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	Ampl. [R mag]	Distance [arcmin]	MP %
15877_2	-	254.703470476	-52.602380112	23.035	-	-	-	3.0:	6.8	-
11351_8	173273	254.896720660	-52.836752470	14.465	15.205	1.285	1.523	0.07	9.0	-
26313_3	67881	254.415548223	-52.753401371	13.999	15.261	1.798	2.677	0.04	13.2	-
05327_6	124207	254.603157998	-53.029501689	14.850	15.324	0.881	0.957	0.03	20.2	-
04281_3	48982	254.572575855	-52.797861044	14.531	15.331	1.279	1.495	0.02	9.0	-
04319_3	49009	254.427392028	-52.794585896	14.588	15.372	1.254	1.491	0.03	13.5	-
23474_5	113269	254.198230796	-53.082982900	14.599	15.400	1.471	1.531	0.09	30.6	-
03878_4	74227	254.188239396	-52.805213798	14.630	15.417	1.169	1.485	0.05	21.9	-
16505_4	-	254.277901396	-52.611645452	14.891	15.439	0.856	1.077	0.02	18.9	-
13952_7	155685	254.833974119	-52.891196229	14.937	15.508	1.005	1.127	0.04	11.2	-
05891_1	4306	255.080076806	-52.726794719	14.989	15.633	0.969	1.202	0.02	11.3	-
25606_6	138852	254.495945379	-53.020895006	15.119	15.634	0.904	1.018	0.01	21.2	-
22477_2	40819	254.690203633	-52.656152556	15.014	15.708	1.214	1.451	0.07	4.3	3
01236_4	72177	254.187040479	-52.713561643	15.135	15.725	0.933	1.111	0.01	21.2	-
05668_3	50025	254.623806426	-52.661485581	15.138	15.796	1.098	1.317	0.01	6.0	-
10184_1	7408	255.092386160	-52.658083152	14.729	15.809	1.755	2.343	0.05	12.1	-
04173_6	123343	254.621995061	-53.085040163	15.328	15.833	0.881	1.001	0.01	23.2	-
15343_2	-	254.770702368	-52.609720836	15.370	15.863	0.900	1.064	0.00	5.9	-
04540_6	123621	254.485832906	-53.064431642	15.397	15.904	0.881	0.996	0.02	23.7	-
23883_4	89157	254.216074468	-52.590141284	15.356	15.925	0.937	1.108	0.01	21.4	-
08512_7	150821	254.695827862	-52.969171258	15.402	15.957	0.883	1.104	0.02	15.9	-
17106_4	84006	254.286044592	-52.582957236	15.454	15.967	0.884	1.025	0.02	19.2	-
14599_1	10660	254.934027456	-52.587221603	15.334	15.975	1.062	1.220	0.02	9.4	-
04607_2	26693	254.776657557	-52.755229164	15.494	16.002	0.886	1.105	0.03	2.8	0
23054_2	41297	254.729117572	-52.623215206	14.916	16.005	1.784	2.530	0.02	5.3	12
23368_1	16649	254.892499238	-52.618200382	15.549	16.040	0.856	1.000	0.01	7.0	-
19050_8	178988	254.931003357	-53.083061626	15.481	16.064	0.921	1.148	0.02	23.2	-
13344_1	9747	254.880051821	-52.608379595	15.602	16.076	0.860	0.961	0.01	7.2	-
24707_5	114148	254.239016884	-52.908175094	15.545	16.098	0.851	1.026	0.02	22.7	-
15143_2	34997	254.717998331	-52.612426745	15.530	16.174	1.180	1.382	0.01	6.1	58
13431_1	9810	255.088829650	-52.606362412	15.655	16.205	0.924	1.080	0.01	13.1	-
17430_5	108741	254.332979418	-52.880707546	14.843	16.279	1.754	3.260	0.13	19.0	-
13073_1	9538	254.881018074	-52.612942861	15.707	16.331	1.007	1.173	0.02	7.0	-
11792_8	173579	254.951230554	-53.084956409	15.516	16.349	1.325	1.605	0.04	23.5	-
08457_7	150775	254.722277418	-52.969935325	15.796	16.369	0.864	1.120	0.03	15.8	-
12453_8	173994	254.912800088	-53.049048629	15.765	16.391	1.009	1.252	0.02	21.1	-
26211_8	184067	254.901535431	-53.057270437	15.784	16.419	1.014	1.239	0.02	21.5	-
23737_4	89067	254.236802502	-52.598492046	15.794	16.432	0.975	1.217	0.02	20.5	-
05982_3	50264	254.421725658	-52.629770606	15.096	16.452	1.995	3.172	0.07	13.6	-
01810_2	24442	254.684592868	-52.794551835	15.350	16.469	1.811	2.241	0.01	6.0	-
28407_4	92169	254.336300773	-52.563553968	15.807	16.470	1.016	1.239	0.01	18.0	-
02433_7	145390	254.801403096	-53.058306375	15.823	16.507	1.064	1.298	0.03	21.0	-
11785_3	55053	254.627601281	-52.719312463	16.004	16.539	0.892	1.031	0.01	5.2	-
17464_5	108772	254.184033572	-52.876729556	15.712	16.558	1.155	1.479	0.05	23.6	-
16742_5	108164	254.238860400	-52.956317691	15.582	16.560	1.591	1.823	0.02	24.4	-
15240_2	35074	254.740026868	-52.611151405	16.008	16.576	0.926	1.199	0.05	5.9	6
22227_5	-	254.382144163	-53.009810280	15.924	16.609	0.977	1.329	0.05	22.9	-
04392_8	168622	254.957143445	-53.056818971	14.741	16.622	2.001	4.657	0.12	22.0	-
14798_7	156453	254.850526253	-52.878232640	15.768	16.633	1.230	1.547	0.01	10.6	-
01679_2	24338	254.824880791	-52.795983855	15.967	16.634	1.044	1.334	0.04	5.6	-
02493_2	25002	254.669614398	-52.785376915	16.149	16.636	0.888	1.066	0.02	5.9	0
11105_6	128214	254.581143422	-53.029053684	16.198	16.735	0.910	1.065	0.01	20.4	-
14222_8	175175	254.929878098	-52.947505054	16.240	16.803	0.947	1.099	0.02	15.5	-
02875_7	145798	254.655457746	-53.052033581	16.259	16.849	0.925	1.154	0.02	21.0	-
26490_1	18773	254.913679865	-52.759462661	15.645	16.860	1.694	2.887	0.01	6.0	-
26475_5	115537	254.183141777	-53.019781837	16.256	16.862	0.905	1.098	0.02	28.3	-
20138_5	110664	254.187023915	-52.933300785	15.228	16.870	1.965	3.971	0.06	25.1	-
19794_7	160897	254.832980735	-52.940633495	16.073	16.887	1.108	1.580	0.02	14.1	-
04395_3	49073	254.578820499	-52.787020479	16.047	16.917	1.300	1.625	0.03	8.4	-

Table A.8. continued.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$\overline{R}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	Ampl. [R mag]	Distance [arcmin]	MP %
13982_1	10216	254.980745814	-52.597526691	16.360	16.968	1.040	1.176	0.01	10.1	-
15500_6	131491	254.428654489	-53.016789930	16.375	16.997	1.242	1.318	0.09	22.3	-
28039_6	140502	254.609979317	-52.873147902	16.434	17.038	0.974	1.176	0.01	11.5	-
13872_8	174918	255.076783646	-52.967649449	16.294	17.068	1.099	1.494	0.06	19.1	-
24621_6	138144	254.616811813	-53.040489156	16.527	17.125	0.943	1.161	0.02	20.7	-
23516_4	88917	254.180833350	-52.608767757	16.534	17.137	0.985	1.194	0.01	22.3	-
24991_5	114351	254.384331589	-52.864700667	16.519	17.162	0.968	1.171	0.02	16.9	-
11266_7	153286	254.865083067	-52.929625368	16.652	17.173	0.869	1.035	0.02	13.7	-
00503_1	371	255.087393181	-52.811569453	16.474	17.183	1.168	1.408	0.03	13.1	-
10707_1	7796	255.033486335	-52.650170323	16.648	17.203	0.924	1.124	0.02	10.2	-
13425_7	155210	254.840832640	-52.899288938	16.681	17.219	0.831	1.077	0.05	11.7	-
10573_7	152651	254.796253882	-52.939824135	16.472	17.221	1.105	1.374	0.02	13.9	-
04428_3	49099	254.432226579	-52.783712525	16.715	17.237	0.849	1.070	0.01	13.1	-
04646_4	74783	254.320409138	-52.784648121	15.544	17.265	1.971	4.171	0.07	17.0	-
04540_2	26638	254.854179209	-52.755971227	16.316	17.268	1.547	1.884	0.01	4.2	0
27239_6	140023	254.438576590	-52.970843095	16.726	17.370	0.996	1.227	0.03	19.8	-
25810_5	115001	254.384646499	-52.948918666	16.551	17.383	1.132	1.508	0.03	20.1	-
19606_6	134536	254.621391134	-52.935510530	16.703	17.415	1.173	1.419	0.08	14.7	-
17003_7	158447	254.811951103	-52.847685721	16.681	17.418	1.143	1.425	0.04	8.5	-
07644_3	51551	254.601869594	-52.646720559	16.818	17.437	0.947	1.196	0.02	7.2	-
05697_7	148296	254.779599183	-53.009228099	16.702	17.438	1.164	1.444	0.03	18.1	-
30092_1	-	255.090701745	-52.670212852	16.835	17.456	1.065	1.276	0.04	11.9	-
10578_2	31384	254.734167675	-52.673090562	16.890	17.505	1.120	1.259	0.02	2.5	-
15276_8	175977	255.032763976	-52.885173750	16.830	17.535	1.125	1.439	0.03	14.2	-
07619_2	29043	254.811684961	-52.712570710	17.009	17.559	0.960	1.147	0.02	1.5	7
18827_4	85412	254.306270509	-52.702248593	16.915	17.624	1.148	1.337	0.02	16.9	-
15065_6	131140	254.478160687	-53.072171326	17.010	17.658	1.070	1.307	0.03	24.3	-
00879_1	650	255.016171891	-52.805376567	16.955	17.668	1.158	1.380	0.03	10.6	-
09335_3	52978	254.443067690	-52.713365695	16.956	17.709	1.428	1.576	0.04	11.9	-
12313_3	55498	254.612422276	-52.606934830	16.891	17.727	1.285	1.606	0.03	8.4	-
03467_7	146313	254.720012598	-53.043004564	16.823	17.731	1.135	1.767	0.09	20.2	-
12230_2	32699	254.815958044	-52.651011235	17.029	17.748	1.192	1.463	0.07	3.8	4
11348_7	153358	254.732264552	-52.928718851	17.115	17.753	0.975	1.252	0.03	13.3	-
11777_1	8568	254.921940390	-52.633881686	17.234	17.765	0.989	1.090	0.02	7.1	-
05369_3	-	254.487898227	-52.688372708	17.095	17.769	1.086	1.366	0.02	10.4	-
09457_3	53082	254.494573883	-52.702377364	17.060	17.794	1.148	1.443	0.07	10.0	-
08455_7	150773	254.833791012	-52.969794476	17.251	17.862	1.045	1.194	0.03	15.9	-
03081_7	145976	254.826290498	-53.048481819	17.175	17.900	1.016	1.354	0.05	20.5	-
19255_4	85763	254.211076180	-52.657335214	17.268	17.908	1.125	1.305	0.03	20.6	-
09775_4	78525	254.349915968	-52.647884819	17.143	17.922	1.065	1.461	0.06	15.7	-
13658_1	9981	255.093499387	-52.602477360	17.391	17.994	1.019	1.172	0.02	13.3	-
01325_8	166592	254.899973622	-52.990965132	17.233	17.999	1.146	1.451	0.03	17.6	-
18991_5	109836	254.367964056	-53.015663745	17.317	18.012	0.941	1.295	0.05	23.5	-
10982_3	54387	254.462850556	-52.575056451	17.415	18.018	0.926	1.165	0.01	13.8	-
00690_2	23539	254.688379093	-52.810472274	17.482	18.024	0.942	1.127	0.03	6.8	-
20550_4	86799	254.392718310	-52.799923440	17.370	18.071	1.089	1.393	0.05	14.8	-
13897_3	56875	254.458096857	-52.673541223	17.199	18.083	1.339	1.650	0.02	11.6	-
07665_3	51566	254.484439046	-52.643798202	17.280	18.091	–	1.561	0.10	11.1	-
29733_4	-	254.190912380	-52.703553212	17.482	18.107	1.011	1.255	0.03	21.1	-
13846_2	33961	254.709665037	-52.629843248	17.590	18.207	1.312	1.447	0.09	5.2	39*
14975_3	57806	254.465207600	-52.558813145	17.437	18.222	1.029	1.534	0.03	14.3	-
13353_2	33571	254.703562371	-52.636643531	17.551	18.246	1.342	1.534	0.06	5.0	-
13124_3	56195	254.483299511	-52.762663916	17.572	18.265	1.039	1.374	0.04	10.9	-
13434_1	9812	255.062229061	-52.606358224	17.774	18.318	0.993	1.136	0.03	12.2	-
21802_4	87749	254.356986645	-52.710333125	17.572	18.356	1.115	1.501	0.07	15.0	-
12097_1	8801	255.009255709	-52.628736854	17.377	18.370	1.490	1.933	0.02	9.9	-
10299_3	53801	254.619740373	-52.629216703	17.646	18.376	0.997	1.390	0.05	7.3	-
14735_2	34670	254.747409696	-52.617616901	17.577	18.396	1.286	1.708	0.08	5.5	55*
27639_5	116432	254.187363541	-52.872168980	17.296	18.397	1.469	2.067	0.06	23.3	-

Table A.8. continued.

Star	ID	α_{2000} [deg]	δ_{2000} [deg]	$\overline{R}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	Ampl. [R mag]	Distance [arcmin]	MP %
06772_1	4940	254.886895659	-52.713142090	17.822	18.398	0.902	1.177	0.03	4.2	-
19951_6	134785	254.525836051	-52.908359235	17.630	18.430	1.258	1.526	0.05	14.9	-
11608_1	8447	254.917947764	-52.636605888	17.854	18.534	1.122	1.376	0.02	6.9	-
09052_8	171605	254.917280122	-52.908454920	17.444	18.535	1.563	2.296	0.04	13.1	-
14979_2	34867	254.849030021	-52.614345138	18.002	18.543	0.995	1.219	0.04	6.3	-
12738_3	55863	254.512236460	-52.802176775	17.902	18.662	1.159	1.550	0.05	10.9	-
18918_2	37919	254.700600310	-52.561027356	18.152	18.711	1.018	1.237	0.03	9.2	-
24649_5	114100	254.189949967	-52.917769863	17.943	18.732	1.164	1.476	0.11	24.5	-
06593_3	50722	254.611170110	-52.574208558	17.971	18.769	1.256	1.600	0.04	9.9	-
26330_5	115420	254.376146705	-53.059943442	18.168	18.835	1.084	1.315	0.06	25.5	-
14117_3	57064	254.451450095	-52.648219022	18.142	18.878	1.080	1.371	0.02	12.2	-
05648_1	4137	255.028308571	-52.731017438	18.202	18.892	1.098	1.424	0.04	9.5	-
20127_8	179813	255.087732545	-53.019120980	18.112	18.909	1.234	1.593	0.06	21.9	-
16573_1	12106	254.996782447	-52.554918919	18.373	18.959	1.066	1.191	0.02	12.3	-
11636_2	32228	254.741734822	-52.659219201	18.365	18.977	0.929	1.335	0.08	3.1	59*
27451_6	140166	254.475678573	-53.046675113	18.195	19.017	–	1.526	0.11	22.9	-
06375_3	50562	254.441211579	-52.593573009	18.230	19.031	–	1.498	0.02	13.8	-
01310_1	969	255.078222174	-52.798865187	18.062	19.047	1.434	1.971	0.02	12.4	-
28655_4	92338	254.377913474	-52.733330472	18.303	19.059	1.190	1.521	0.05	14.4	-
15984_8	176509	254.969343828	-52.845694875	18.307	19.060	1.061	1.438	0.32	10.9	-
12691_7	154548	254.734581721	-52.909483223	18.166	19.090	1.324	1.788	0.14	12.1	-
01647_1	1220	255.065821964	-52.793412800	18.584	19.152	1.466	1.394	0.25	11.9	-
01613_1	1194	254.911113437	-52.794320612	18.556	19.156	1.023	1.184	0.03	7.2	-
08210_3	52021	254.504165099	-52.817828273	18.254	19.217	1.404	1.892	0.02	11.7	-
05077_2	27059	254.688821000	-52.748940203	18.568	19.331	1.288	1.661	0.11	3.8	8*
09250_3	52908	254.622067452	-52.721515269	18.533	19.357	1.222	1.604	0.10	5.5	-
23979_5	113600	254.284229414	-53.020866253	18.792	19.408	0.863	1.151	0.24	25.7	-
14471_2	34464	254.852379348	-52.621082471	18.616	19.439	1.283	1.765	0.02	6.0	-
17201_2	36599	254.732771506	-52.583879199	18.757	19.465	1.250	1.516	0.08	7.6	-
24598_1	17470	254.929651594	-52.587111414	18.874	19.478	–	1.216	0.24	9.3	-
09627_3	53226	254.412694161	-52.686333200	18.679	19.555	1.240	1.694	0.03	13.1	-
26411_4	90948	254.253347727	-52.744245829	18.622	19.575	0.891	1.683	0.23	18.9	-
00589_2	23458	254.699544546	-52.812227878	18.971	19.592	1.004	1.294	0.15	6.7	-
28662_5	117213	254.358583280	-52.886139263	18.946	19.595	0.946	1.241	0.06	18.4	-
27455_4	91537	254.191463335	-52.580710386	18.589	19.608	1.613	2.095	0.06	22.4	-
26830_5	115800	254.387815806	-52.922615996	18.965	19.703	1.021	1.352	0.45	18.9	-
16144_2	35806	254.693955617	-52.598659003	19.116	19.862	1.248	1.630	0.04	7.2	-
20250_3	62457	254.444505271	-52.584388594	19.144	19.912	1.090	1.517	0.04	14.0	-
23070_7	163512	254.736493407	-53.006712137	19.212	19.914	–	–	0.19	17.9	-
02473_4	73146	254.374110070	-52.614649897	19.107	19.939	0.932	1.532	0.12	15.5	-
00771_1	573	254.938952802	-52.807392294	18.825	19.948	1.571	2.654	0.05	8.5	-
08578_8	171254	254.924563366	-52.923498624	18.760	20.005	1.649	3.091	0.11	14.1	-
12662_3	55797	254.426410046	-52.811994226	19.352	20.069	1.284	1.574	0.05	14.0	-
25559_3	67209	254.542912244	-52.723409001	20.016	20.211	0.421	0.567	0.91	8.3	-
04463_2	26579	254.650065716	-52.757554855	19.549	20.277	1.036	1.598	0.15	5.3	-
12510_1	9109	255.027339311	-52.621361522	19.739	20.286	0.943	1.083	0.17	10.7	-
04386_1	3242	255.007984854	-52.750361102	19.667	20.406	1.146	1.469	0.11	9.0	-
14012_2	34092	254.716283261	-52.627553480	19.948	20.470	1.041	1.273	0.17	5.2	0*
13389_2	33601	254.787481909	-52.636082942	19.975	20.750	1.090	1.639	0.07	4.4	-
15110_1	11044	255.007528010	-52.578768176	19.721	20.818	1.582	2.311	0.09	11.6	-
25217_1	17912	254.974258061	-52.570400191	21.028	22.140	–	2.414	1.87	11.1	-
03001_7	145910	254.811174622	-53.049901469	20.984	22.227	–	2.289	0.76	20.5	-
29653_2	-	254.703773386	-52.552573888	18.810	–	–	–	1.96	9.7	-
14937_7	-	254.837063947	-52.876393346	22.493	–	–	–	1.19	10.4	-
27889_1	19734	254.974993381	-52.619214002	22.261	–	–	–	2.49	9.2	-
22073_1	-	254.894797264	-52.656268542	22.888	–	–	–	1.83	5.5	-

Table A.9. List of binary systems (contact, detached and semi-detached binaries) located at less than 8′ from the centre which are considered as candidate members of NGC 6253.

Star	ID	Type	α_{2000} [deg]	δ_{2000} [deg]	$R_{\rm max}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm min}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %	Membership CMD B-V	CMD V-I	PLC B-V	PLC V-I
Contact binaries																	
23188_2	41404	EW	254.656188433	-52.61619778	14.464	14.928	0.751	0.923	70.594	0.49680	0.32	6.9	87	y	y	y	y
10853_2	31606	EW	254.800782797	-52.669356128	16.342	16.921	1.049	1.191	70.777	0.29340	0.02	2.6	78	y	y	y	y
01015_2	23797	EW	254.782447929	-52.805883546	15.462	15.969	0.874	1.036	70.637	0.38720	0.05	5.9	22	y	y	y	y
13288_2	33521	EW	254.673007553	-52.637555967	14.807	15.444	1.291	0.955	70.867	0.47290	0.44	5.5	3	n	y	y	y
09268_2	30341	EW	254.720919972	-52.690243537	15.572	16.244	1.159	1.363	70.637	0.26920	0.04	2.1	87	n	n	y	n
03079_1	2271	EW	254.891186992	-52.771171402	16.672	17.416	1.177	1.026	70.918	0.34880	0.39	5.8	–	y	n	y	n
10805_2	31566	EW	254.770365377	-52.670201471	17.518	18.728	0.563	1.613	70.773	0.37090	0.44	2.3	32	n	y	n	y
27757_1	19653	EW	254.908178020	-52.633411290	17.629	18.386	0.796	1.435	70.848	0.27310	0.30	6.7	–	n	y	n	y
05435_3	49849	EW	254.560369896	-52.682548310	17.831	18.476	1.525	1.149	70.773	0.37428	0.19	7.8	–	y	n	y	n
02366_2	24892	EW	254.828122494	-52.786876736	17.069	17.982	0.524	1.258	70.594	0.36350	0.31	5.2	35	n	y	n	n
09914_1	7211	EW	254.964750204	-52.662654779	17.972	18.661	1.247	1.147	70.582	0.28650	0.17	7.6	–	y	n	n	n
17194_2	36595	EW	254.750496117	-52.583899859	17.339	18.167	0.980	1.251	70.742	0.29400	0.28	7.5	–	n	y	n	n
26552_1	-	EW	254.883268519	-52.754444185	17.318	17.894	0.947	1.186	70.613	0.48143	0.02	4.9	–	n	y	n	n
Detached and semi-detached systems																	
26902_2	44079	RS CVn	254.760879590	-52.738914968	14.599	15.081	0.843	1.024	72.090	2.1805	0.05	1.9	90				
25070_2	-	RS CVn	254.813983216	-52.738528086	18.513	19.219	—	1.540	71.953	1.4553	0.06	2.4	—				
09161_2	30259	EA	254.800143085	-52.691547335	19.384	20.527	2.125	2.367	70.859	0.50611	0.69	1.5	—				
17502_2	36826	EA	254.750395425	-52.579915829	20.927	22.030	—	2.596	70.855	0.54690	0.44	7.7	—				
10340_2	31195	EA	254.706854237	-52.676396811	15.894	16.397	0.920	1.103	72.051	1.8156	0.02	3.0	38				
06539_2	28209	EA	254.653146758	-52.728429918	17.968	18.775	1.126	1.477	70.727	0.68230	0.19	4.4	—				
13573_2	33743	EA	254.812702563	-52.633378426	16.518	17.003	0.873	1.027	71.039	2.3016	0.34	4.7	8				
00145_2	23102	EB	254.732762682	-52.818849796	16.494	17.223	1.228	1.198	70.676	0.29110	0.26	6.8	0				
08123_2	29437	EB	254.789360265	-52.705813364	19.884	20.992	1.385	2.252	70.883	0.31903	0.15	0.7	—				

Table A.10. List of rotational and long-period variables located at less than 8′ from the centre which are considered to be candidate cluster members.

Star	ID	Type	α_{2000} [deg]	δ_{2000} [deg]	$\overline{R}$ [mag]	$\overline{V}$ [mag]	$\overline{B}-\overline{V}$ [mag]	$\overline{V}-\overline{I}$ [mag]	$T_{\rm max}$ [HJD]	Period [d]	Ampl. [R mag]	Distance [arcmin]	MP %
09901_2	30842	RO1	254.732275735	-52.681556393	17.619	18.247	1.038	1.351	72.668	1.11842	0.08	2.1	—
11977_1	8713	RO1	254.929865891	-52.630746475	16.185	16.592	0.749	0.849	71.188	1.8424	0.01	7.4	—
07392_1	5378	RO1	254.904680899	-52.702647524	17.641	18.217	1.040	1.195	70.914	2.982	0.11	4.9	—
14911_2	34814	RO1	254.721536966	-52.615435459	17.702	18.299	1.053	1.212	70.902	1.5806	0.05	5.9	63
10372_2	31220	RO1	254.679930555	-52.675735040	17.650	18.317	1.080	1.456	72.957	2.735	0.04	3.8	26
15993_2	35676	RO1	254.846280438	-52.600497324	18.851	19.741	1.462	1.844	71.766	3.151	0.03	7.0	—
10042_2	30960	RO1	254.772538141	-52.679593806	15.946	16.379	0.872	1.029	71.445	3.134	0.07	1.7	87
11077_2	31786	RO1	254.861672278	-52.666238861	16.725	17.281	0.978	1.194	70.801	5.12	0.06	4.2	71
06236_1	4548	RO1	254.893544476	-52.721902773	16.148	16.614	0.865	0.972	72.207	1.7453	0.01	4.5	—
06932_2	28498	RO1	254.812770851	-52.722474381	17.550	18.151	1.072	1.347	70.688	0.90140	0.05	1.7	10
09775_2	30740	RO1	254.850965423	-52.683323748	17.484	18.182	1.118	1.482	72.156	2.1351	0.02	3.3	64
04913_3	49473	RO1	254.567369728	-52.735127801	17.894	18.513	1.035	1.240	71.395	1.10089	0.04	7.6	—
00455_2	23352	RO1	254.786845032	-52.814066276	19.023	19.914	1.496	1.862	70.949	1.21222	0.07	6.4	—
22278_2	40654	RO1	254.649579305	-52.665822056	19.457	20.440	1.604	2.026	70.988	0.86412	0.07	5.1	—
06387_2	28088	RO2	254.793146373	-52.730407627	15.970	16.476	0.937	1.130	71.191	0.92213	0.02	1.6	85
02131_1	1588	RO2	254.946929133	-52.786367467	19.053	20.007	1.239	1.889	71.059	1.8307	0.16	7.9	—
15877_2	—	Erupt.	254.703470476	-52.602380112	23.035	—	—	—	—	—	3.0:	6.8	—
07619_2	29043	LON	254.811684961	-52.712570710	17.009	17.559	0.960	1.147	—	—	0.02	1.5	7
12230_2	32699	LON	254.815958044	-52.651011235	17.029	17.748	1.192	1.463	—	—	0.07	3.8	4
05077_2	27059	LON	254.688821000	-52.748940203	18.568	19.331	1.288	1.661	—	—	0.11	3.8	8
11785_3	55053	LON	254.627601281	-52.719312463	16.004	16.539	0.892	1.031	—	—	0.01	5.2	—
13846_2	33961	LON	254.709665037	-52.629843248	17.590	18.207	1.312	1.447	—	—	0.09	5.2	39
14735_2	34670	LON	254.747409696	-52.617616901	17.577	18.396	1.286	1.708	—	—	0.08	5.5	55
09250_3	52908	LON	254.622067452	-52.721515269	18.533	19.357	1.222	1.604	—	—	0.10	5.5	—
15240_2	35074	LON	254.740026868	-52.611151405	16.008	16.576	0.926	1.199	—	—	0.05	5.9	6
00690_2	23539	LON	254.688379093	-52.810472274	17.482	18.024	0.942	1.127	—	—	0.03	6.8	—
11608_1	8447	LON	254.917947764	-52.636605888	17.854	18.534	1.122	1.376	—	—	0.02	6.9	—
23368_1	16649	LON	254.892499238	-52.618200382	15.549	16.040	0.856	1.000	—	—	0.01	7.0	—
11777_1	8568	LON	254.921940390	-52.633881686	17.234	17.765	0.989	1.090	—	—	0.02	7.1	—
13344_1	9747	LON	254.880051821	-52.608379595	15.602	16.076	0.860	0.961	—	—	0.01	7.2	—
07644_3	51551	LON	254.601869594	-52.646720559	16.818	17.437	0.947	1.196	—	—	0.02	7.2	—
10299_3	53801	LON	254.619740373	-52.629216703	17.646	18.376	0.997	1.390	—	—	0.05	7.3	—
17201_2	36599	LON	254.732771506	-52.583879199	18.757	19.465	1.250	1.516	—	—	0.08	7.6	—

Appendix B: Light curves of periodic variables in NGC 6253

This Appendix includes the folded light curves of the periodic variables, separated according to our classification:

1. Pulsating variables: Figure B.1;
2. EW–type variables: Figure B.2;
3. EB–type variables: Figure B.3;
4. EA–type variables: Figure B.4;
5. RS-CVn variables: Figure B.5;
6. Binaries and RS CVn systems with uncertain (long) period: Figure B.6;
7. Rotational single-wave variables: Figure B.7
8. Rotational double-wave variables: Figure B.8.

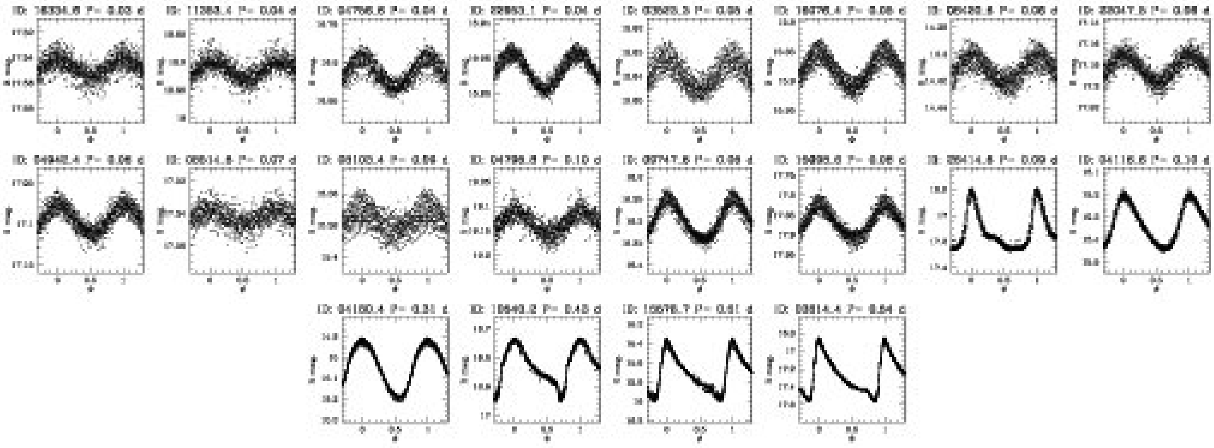
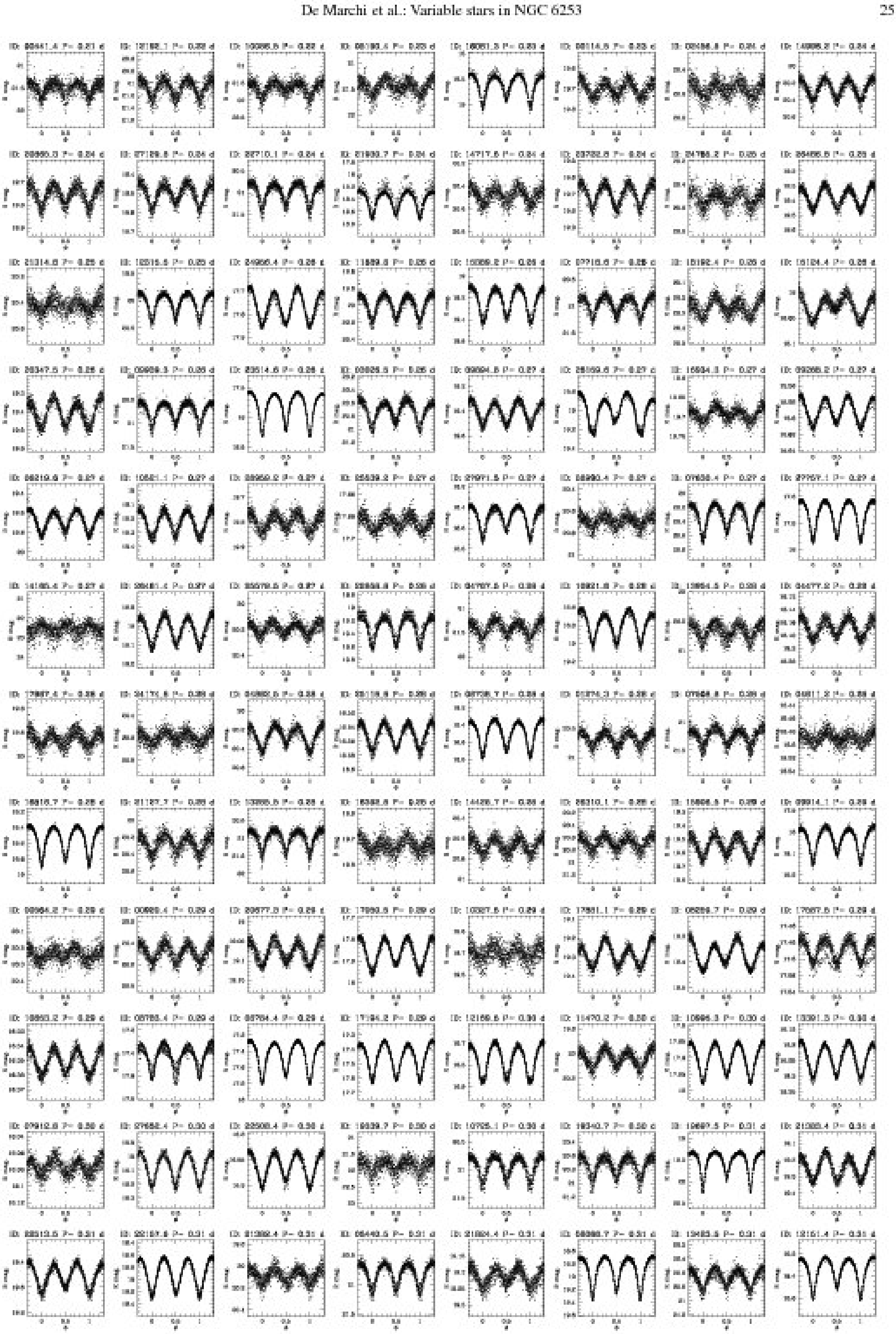
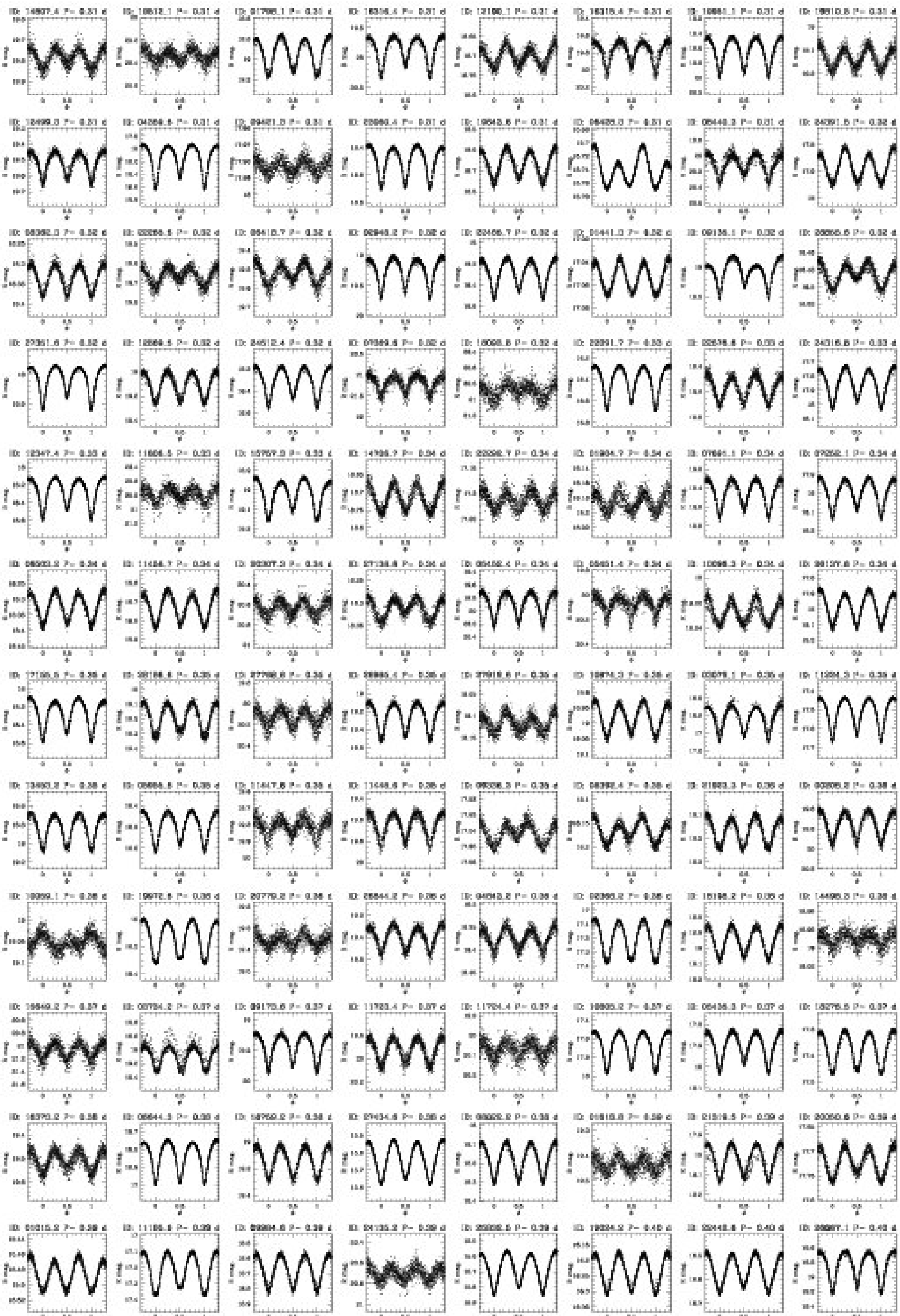


Fig. B.1. The light curves of the pulsating variables.


De Marchi et al.: Variable stars in NGC 6253
25



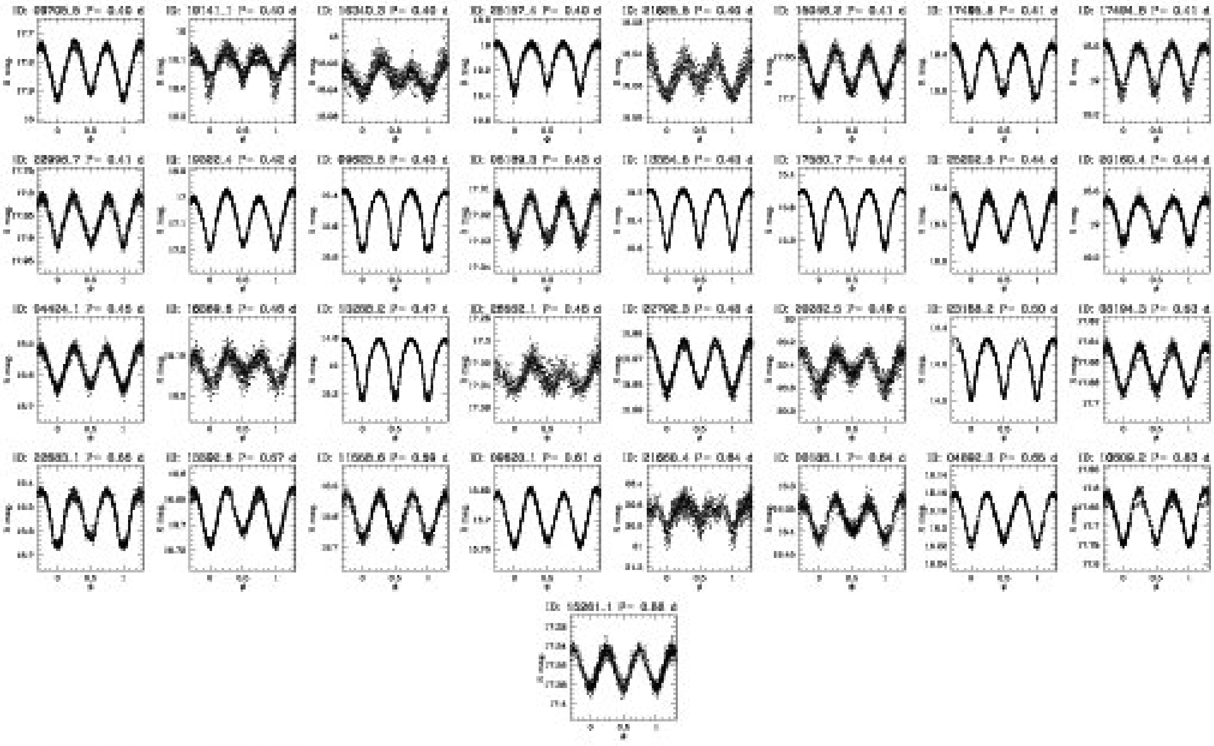


Fig. B.2. The light curve of the EW-type contact systems.

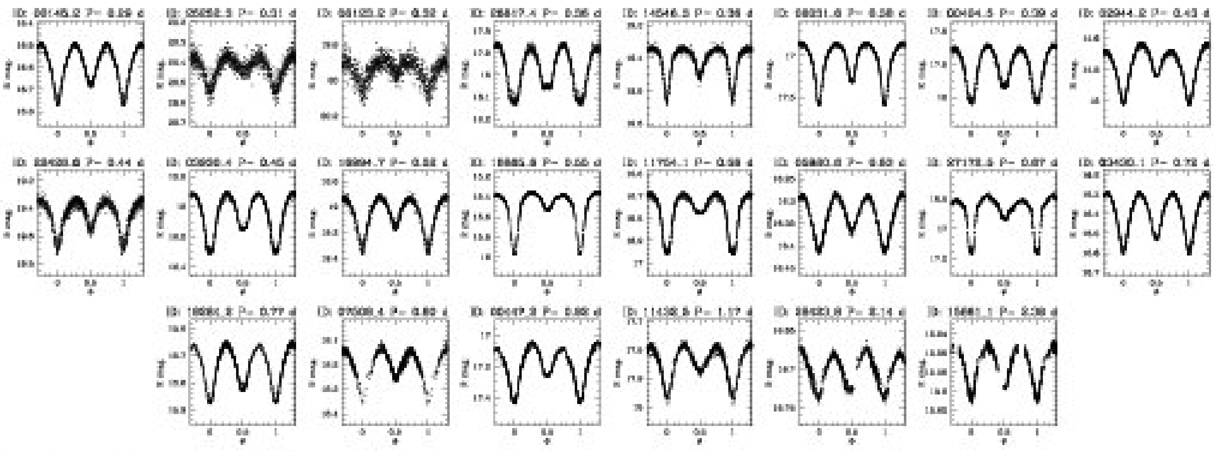


Fig. B.3. The light curves of the EB-type systems.

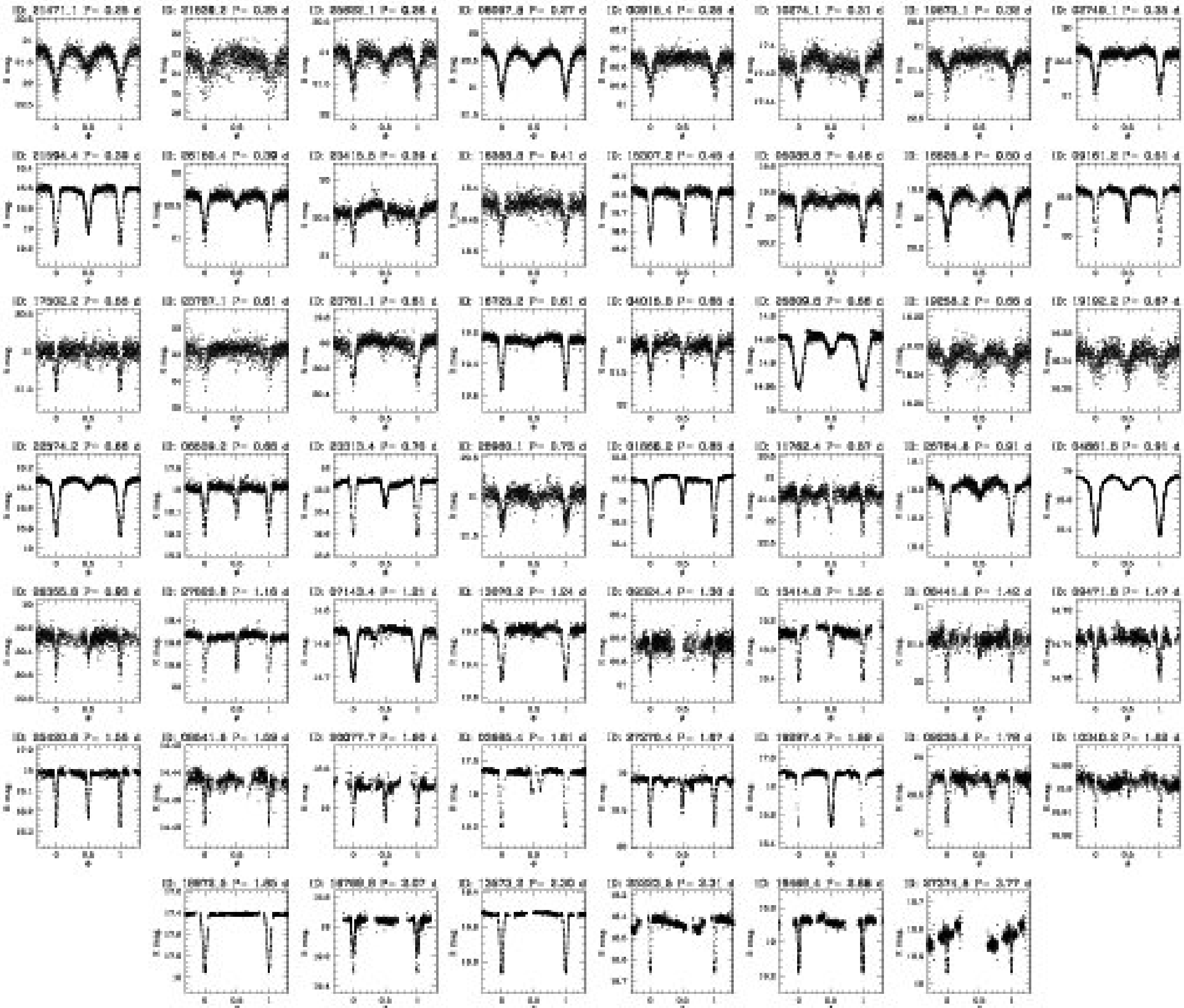


Fig. B.4. The light curves of the EA-type systems.

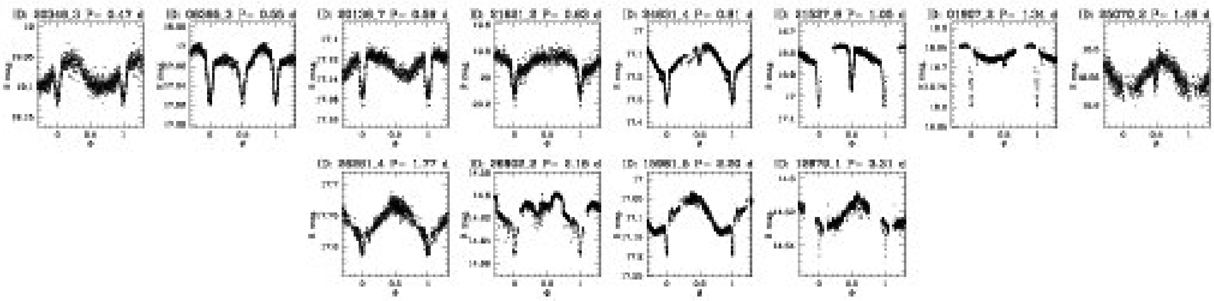


Fig. B.5. The light curves of the RS CVn variables.

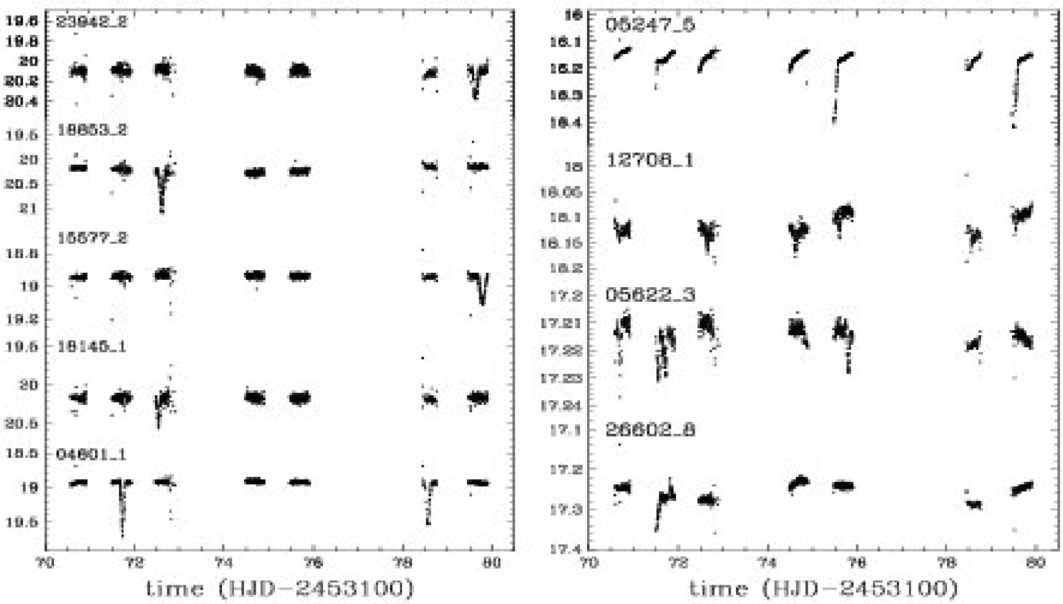


Fig. B.6. The light curves of eclipsing systems with uncertain period. *Left panel:* EA binaries. *Right panel:* RS CVn systems

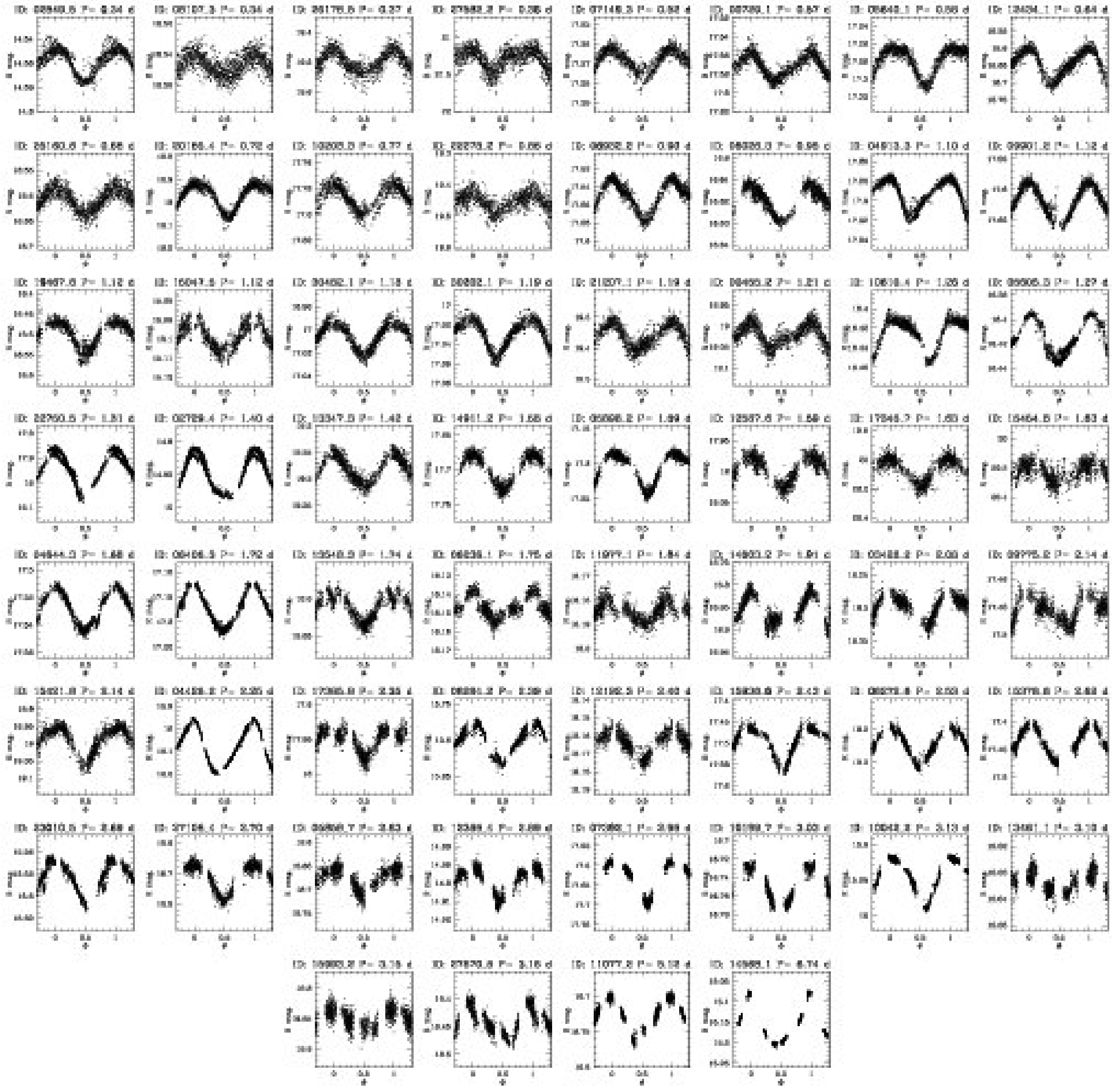


Fig. B.7. The light curves of the single-wave rotational variables (RO1).

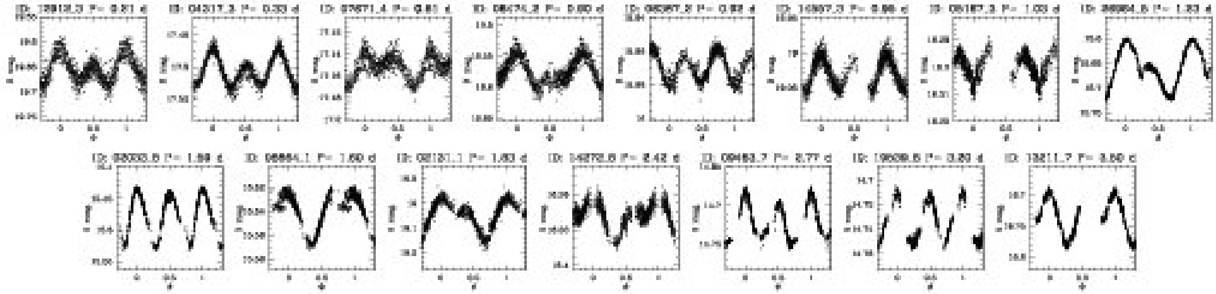


Fig. B.8. The light curves of double-wave and/or distorted rotational variables (RO2).